JPRS 77670

25 March 1981

China Report

AGRICULTURE

No. 129

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CHINA REPORT

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ABSTRACTS

METEOROLOGY

I. GENERAL INFORMATION

IMPROVED MODEL OF DONGFENG-5 COMBINE HARVESTER TO APPEAR

Beijing NONGYE JIXIE [FARM MACHINERY] in Chinese No 7, 18 Jul 80 pp 14-15

[Article by Design Department, Siping Combine Harvester Plant: "Modified Version of Dongfeng-5 Combine Harvester to Appear"]

[Text] The Dongfeng-5 combine harvester is already quite unable to meet the requirements of high-output farming. Its feed rate under normal conditions is only 3 to 4 kilograms per second. Its efficiency is low, losses are large and it easily becomes jammed.

However, the harvester is seeing increasingly extensive use in our country's wheat-producing areas such as north China, central China and the like where yields of irrigated winter wheat reach 500-800 jin per mu. It is becoming increasingly urgent that the machine be adapted for high-yield farming.

On the basis of user requirements the Siping Combine Harvester Plant thoroughly modernized the design in the Dongfeng-5 harvester. A 2-wheel version of the machine had already been developed, and this year a 3-wheel version was experimentally developed. The overall productivity of the improved model is up by 25-30 percent; the feed rate has been increased to 5 kg/sec. Driving conditions have been improved with the addition of a driver's cab. Attachments for the harvesting of such crops as soybeans, paddy rice and corn have been added in order to expand the range of uses.

The design improvement program for the Dongfeng-5 was developed on the basis of the abovementioned requirements.

1. Measures to Increase Productivity.

A. The machine has been equipped with an X6102LZ supercharged 120-horsepower diesel engine and the number of model C triangular rubber transmission belts has been increased from 3 to 4, giving the machine sufficient power and strength so as to assure steady belt transmission operation at high feed rates.

B. The threshing drum diameter has been increased from 550 to 650 mm, and the number of rasp bars from 8 to 10. The included angle of the concave has been increased from 101° to 120°, increasing the separator surface by 41 percent. The straw walker length has been increased from 3170 to 3760 mm and the speed of rotation from 195 to 210 rpm. The walker configuration has been changed from 4 fishbacks to 6 and the number of grain holes in the pan increased, thus further improving the straw walker's separating capability.

C. The entry angle of the concave has been decreased from 40° to 32°, so that the passage between the conveyor housing and the concave is more gentle and the feed smoother.

D. The front section of the walker has been lengthened. The thresher beater and concave outlet are so disposed that the straw is not removed horizontally to the rear as before, but under the thresher beater and to the rear, so that it falls on the first fishback of the walker. In addition, the grating strips have been eliminated. Thus, after vigorous separation by the thresher beater, the flow of grain from the concave directly onto the walker surface. This makes full use of the capabilities of this type of separation and avoids the situation in which grains ejected from the straw layer from striking the flap and again being mixed with the straw, thus strengthening the thresher beater's separating ability.

E. The upper sieve is widened to 180 mm and its surface increased by 19.2 percent. In addition the lower sieve is shortened so that the two sieves are in a stepped configuration, thus improving the passage of air from the blower and increasing the effectiveness of the cleaning chamber.

F. The grain elevator rotary speed has been increased from 238 to 300 rpm and the tailings elevator speed from 234 to 252 rpm in order to improve the system's capabilities.

2. Improvements in the Cutting Table

A. The cutting Table surface has been shortened by 100 mm, the reel diameter decreased from 1132 to 1,000 mm, the dead area between the cutter bar and the feed roller decreased, and the feed roller rotary speed increased from 150 to 170 rpm in order to improve the evenness of table feed.

B. The sides of the conveyor housing have been made thicker to increase the rigidity of the housing. The conveyor chain teeth have been modified to a grooved steel type and the diameter of the rivets fastening the conveyor sections to the chain has been increased from 6 to 8 mm, improving the strength of the teeth and the join.

C. The connecting apron between the cutter table and the conveyor has been replaced by a steel guard plate and guard strip, and steel guards for the two sides and the upper opening of the conveyor housing have been added, thus increasing the reliability of the conveyor housing.

D. The table is placed 300 mm to the side to overcome the imbalance resulting from the greater weight of the left side than the right. In addition the location at which force is applied to the balance bar has been changed and the load on the balance bar springs decreased so as to increase the sensitivity of the table terrain-following mechanism.

E. The bolted central ball hinge has been replaced with a self-locking ball hinge for convenience in assembling.

F. A swinging block mechanism was used for the cutter drive in order to decrease impact and make it stable and reliable.

3. The Grain Tank

The grain tank's capacity has been increased from 1.8 to 3 cubic meters to decrease the number of times it must be unloaded and to increase shift efficiency. The grain tank has a sectioned case and a dismountable oblique spreading mechanism to decrease the height of the elevator and for ease in assembly.

4. Driver's Platform and Cab

A. The driver's platform is laterally placed for convenience in the maintenance, replacement and repair of the thresher drum. There is a clear view of the main working area of the cutting table, and the driver can see the operation of the main mechanisms at the rear of the machine. In order to meet the needs of cab assembly, most of the operating levers are grouped at the right of the driver's seat. The close grouping makes operation easy. In order to make activity in the cab easy and comfortable for the driver, an adjustable-slant steering bar and an adjustable seat with hydraulic shock absorbers has been designed. The closed cab has light framing, a double roof and tempered glass windows. The cab also contains a filtered blower system which improves working conditions for the driver.

5. Other Improvements

A. A mechanical variable-speed transmission is provided for the thresher drum, with continuous speed variation from 475 to 1150 rpm; it has reliable drive and is easy to control. The thresher axle diameter and central axle diameter have both been increased to 60 mm, increasing the drum's rigidity and reliability.

B. Cycloidal cam type concave adjusting mechanism:

When the thresher drum becomes jammed, the concave clearance can rapidly be increased. The maximum clearance is 58 mm at the intake and 54 mm at the exit. The advantage of this new mechanism is that it has good support rigidity, and compact structure, and is easy to operate.

C. A cover with a valve is provided to keep the water tank clean and prevent overheating of the engine.

D. The combine has a spike tooth drum and spike tooth concave for hulling paddy rice.

E. The spike tooth drum has a diameter of 650 mm and has 180 teeth in 12 rows. The spiked tooth concave has 88 teeth in 4 rows and the included angle is 102°.

E. A large-bar concave is used for shelling soybeans and corn. Its included angle is 96° and it has 9 bars. The grating strips have a diameter of 8 mm and the lattice strips are made of 12 X 80 mm and 10 X 45 slat steel.

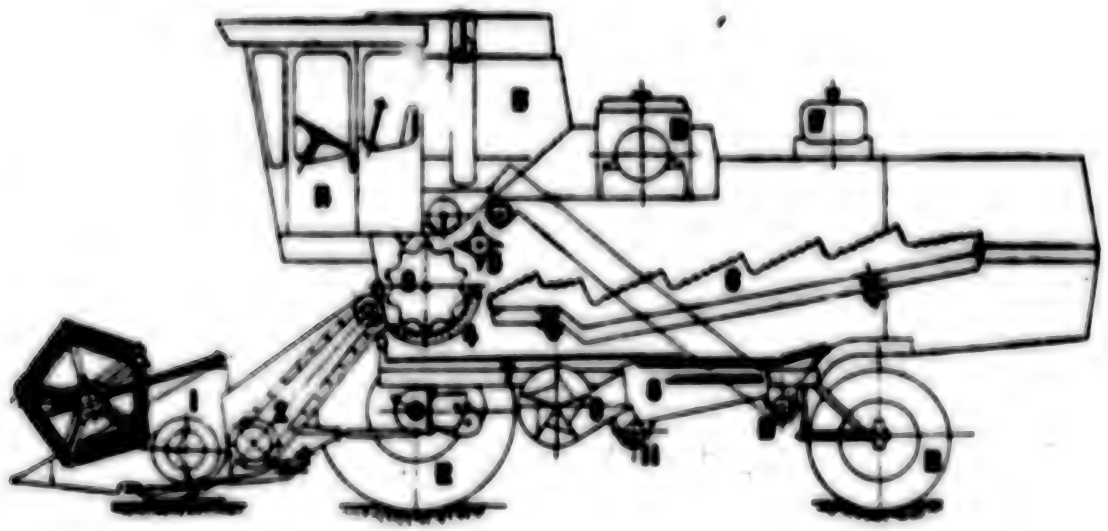
F. Thresher drum and engine revolution indicators and warning signals are located in the cabin. The driver can quickly adjust the machinery to the optimum operating

conditions on the basis of the instrument readings and can eliminate malfunctions expeditiously.

G. The electrical system has been converted to 24 volts; a 24-volt silicon-controlled rectifier generator is used and the rotary switch eliminated in order to improve starting and charging reliability.

H. An air flap is installed in front of the thresher drum housing, and there is no rush of air out of the conveyor housing, which prevents entry of dust from the cutting table and assures that the driver's surroundings will be clean.

A new high-efficiency combine harvester will soon be available to mechanized agricultural brigades and will play a major role.



KEY:

1. Cutting table
2. Conveyor
3. Threshing drum
4. Concave
5. Thresher beater
6. Walker
7. Grain pan
8. Cleaning sieves
9. Blower
10. Tailings elevator
11. Grain elevator
12. Drive wheel
13. Steering wheel
14. Driver's cab
15. Grain tank
16. Engine
17. Fuel tank

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CSO: 8111/0677

USE OF ANTIBIOTIC FERTILIZER PROMOTED

Beijing GUANGMING RIBAO in Chinese 4 Dec 80 p 2

[Article: "Use of '5406' Antibiotic Fertilizer Promoted For Large Areas With Consistent Results in Increased Output"]

[Text] The "5406" antibiotic fertilizer developed by microbiologist Yin Xinyun [1438 5450 5089] of the Atomic Energy Utilization Institute of the Chinese Academy of Sciences together with other scientists has been promoted for use on more than 100 million mu of land in 29 provinces, municipalities, and autonomous regions. This is a kind of organic fertilizer currently in use over wide areas of China that is broad in scope and has fairly consistent results in increased output.

Antibiotic fertilizer "5406" contains numerous stimulants and antibiotics with multiple effectiveness in increasing soil fertility, stimulating crop growth, preventing disease and protecting seedlings. It has no side effects on crops, is not toxic to humans or animals, and does not pollute the environment. Results of experiments conducted nationwide at several thousand test sites in wheat producing areas, showed that wheat on which this kind of bacterial fertilizer was used averaged from 10 to 20 percent greater output than control wheat. Use of "5406" bacterial growing powder [5497 4429 4720] in recent years for mixing with seeds or for soaking seeds also increased output. Use of half a jin of bacterial growing powder per mu for mixing with seeds or for the soaking of seeds can increase wheat output by from 30 to 50 jin at a cost of only dimes. Zhejiang, Anhui, Hunan, Hubei, and Sichuan rice producing areas have used this bacterial fertilizer to force budding, to propagate seedlings, in a top dressing of fertilizer, or sprayed around the roots, for increases of 10 percent or more in output as against non use of it. When this bacterial fertilizer was used on 40,000 mu of cotton in Tai County, Jiangsu Province last year, average output increased by about 20 percent over fields in which it was not used. When this bacterial fertilizer was used on sweet potatoes, not only did output increase by about 20 percent but it was also possible to reduce the rate of sweet potato rot in storage. When used with economic crops such as tea, tobacco, ginseng, or citrus, this bacterial fertilizer can both boost output and increase their grade. In Xinbin County in Liaoning Province where "5406" bacterial fertilizer has been in use since 1972 for the growing of ginseng, output has averaged an increase of about 20 percent over non use, and quality is one grade higher. This year, "5406" was applied to 110,000 ginseng roots at a cost for bacterial fertilizer of more than 10,000 yuan. On the basis of the 40,000 roots already harvested, an increase in earnings of more than 1.14 million yuan is estimated, or 100 yuan of profit for every yuan invested.

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CSO: 4007

AUTUMN COLD DAMAGE INDEX OF HYBRID RICE, VARIABLE PATTERNS STUDIED

Beijing QIXIANG [METEOROLOGICAL MONTHLY] in Chinese No 11, 10 Nov 80 pp 1-4

[Article by the National Hybrid Rice and Meteorological Science Research Cooperation and Coordination Group: "A Study of the Autumn Cold Damage Index of Hybrid Rice and Its Pattern of Variation"]

[Text] 1. Introduction

Cold damage is common agrometeorological damage throughout the world. Each country is studying it. The multiple planting index of our nation's southern rice regions is relatively high and autumn cold damage is the main agrometeorological damage. In recent years, the areas of hybrid rice have continued to expand and this has become an important measure to increase yield. But, the resistance of hybrid rice to adverse temperature environments is poorer than ordinary rice, therefore its yield fluctuates according to the changes in the weather of each locality and each year. This increases the urgency and necessity to study cold damage of paddy rice.

Since 1939 when Akemine and Hoshika analyzed data of 14 years of experiments of 32 paddy rice varieties and proposed that low temperature is a major meteorological factor that induces sterility in paddy rice,[1] many valuable results[2,3] in the studies of the sensitivity period of crops to cold damage, indicators, physiological mechanisms and preventive measures done domestically and abroad have been obtained. Our nation's broad agrometeorological workers have carried out massive experimental research work on the low temperature cold damage indicators during the heading and flowering periods. But, people have discovered that regardless of how the indices are represented, the cold damage index is not a stable value. It varies according to locality and year. For example, Yunnan pointed out that this indicator is 18.5°C in the Yuxi region at an elevation of 1,600 meters above sea level. But in the Kunming region (1,900 meters), generally 18°C is used and in the Lijiang region (2,400 meters), 16°C is used as the cold damage indices for geng rice varieties of the locality.[4] Jiangsu pointed out that a continuation of temperatures below 23°C for 3 days is the cold damage index for hybrid rice Nanyou No 2,[5] while in the Guidong mountain region in Hunan, when the average temperature is as low as 20°C, the fruiting percentage of hybrid rice is still relatively high.[6] Kondo (1952) treated paddy rice during its period of meiosis with a low temperature of 17°C continuously for 3 years under natural conditions using the same management measures.

The resulting percentages of empty husks differed from year to year. We believed this difference is due to the differences in weather conditions of each year before and after treatment. What is the cause of the instability of the indices? Is it produced by different weather and climatic types of each locality? Or is it caused by other nonmeteorological factors? Does the variation follow a certain pattern? At present, reports by domestic and foreign agrometeorological workers regarding these points have not been seen.

To study the cold damage index for paddy rice and its pattern of change, we organized a total of 23 experimental localities in 11 provinces (cities and autonomous regions) in the southern rice region in 1979 and conducted experiments in geographical sowing in stages. The distribution of these experimental locations spans 10 degrees latitude (from Xinyang in Henan to Nanning in Guangxi), and 18 degrees longitude (from Ningbo in Zhejiang to Wenjiang in Sichuan). The difference in altitude above sea level is 1,391.2 meters (from 1,392.9 meters at Anshun in Guizhou to 1.7 meters at Nanhai in Guangdong). The experiments used Shanyou No 6 of the same source as material and IR26 as control. To eliminate the effects upon the fruiting percentage by nonmeteorological factors, the coordination and cooperation group established a unified experimental plan and established uniform rules for measures and techniques of cultivation of paddy rice. At the experimental localities where conditions were available, experiments of pot planting and pollen development and germination under low temperature conditions were added. The period of the experiments was from March to November of 1979.

II. Index Value and its Pattern of Geographical Variation

(I) Calculation of the Index Value

Autumn cold damage in the southern rice regions mainly refers to the phenomenon of a drop in yield resulting from a drop in the fruiting percentage caused by the flow of cold air from the north to the south during the latter period of young panicle development of paddy rice (especially during the heading and flowering period). Even though the factors that affect the fruiting percentage are many, large scale drop in the fruiting percentage systematically over a large area is mainly caused by low temperatures in autumn. The results of our observations and measurements also proved this basic theory. Table 1 shows the temperatures, percentages of empty husks and the observations and measurements of the development of pollen at each experimental locality. It shows that as low temperatures occur and the duration lengthens, the percentage of abnormalities of pollen grains rises, the percentage of normal germination of pollen grains drops, and the percentage of empty husks visibly increases. Figure 1, and Table 2 also show that regardless of whether it is hybrid rice or ordinary rice, the percentage of empty husks (P) rises as the 5-day sliding average temperature ($\bar{T}_5$) drops. At the same time, the resistance to cold of hybrid rice is poorer than that of ordinary rice. Only under appropriate temperatures can the superiority of increased yield of hybrid rice be fully developed. This article will rely only on the experimental results of Shanyou No 6 to discuss the pattern of geographical variation of the cold damage index and its cause.

Table 1 Effects of Low Temperature Upon the Percentage of Abnormality of Pollen Grains and Percentage of Germination (Shanyou No 6, 12 experimental localities)

Item Temperature (°C)	Percentage of abnormality (percent)	Percentage of germination (percent)	Percentage of empty husks (percent)
Normal temperature 1/2 index temperature	21.4	20.3	16.4
Temperature drop 1-2 days (1/4 index temperature)	27.7	17.6	23.2
Temperature drop 3-4 days (1/4 index temperature)	28.4	10.3	35.1
Temperature drop for over 5 days (1/4 index temperature)	37.1	9.9	43.0

Table 2. Relationship Between Temperature and Percentage of Empty Husks of Hybrid Rice and Ordinary Rice (Average values of 12 experimental locations)

Percentage of empty husks Temperature °C	Type of Variety Shanyou No 6 (hybrid rice)	 IR 26 (ordinary rice)
<18	39.9	32.3
18.1 - 20.0	37.2	22.8
20.1 - 22.0	21.3	17.0
22.1 - 24.0	16.9	11.9
24.1 - 26.0	14.2	12.2
26.1 - 28.0	11.8	9.9

The relationship between temperature conditions and the percentage of empty husks can be expressed by equation (1):

$$\frac{d(P - C)}{dT} = -a\,(P - C) \qquad (1)$$

In the equation, P is the percentage of empty husks, C is the percentage of physiological empty husks which is not affected by temperature conditions but is determined only by the fruiting characteristics of the varieties. This

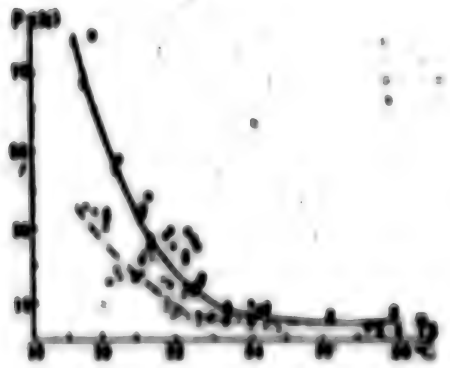


Figure 1. Comparative Diagram of the Cold Resistance of Hybrid Rice and Ordinary Rice (Liuzhou Shatang experimental location). In the figure, the solid line represents Shanyou No 6, the dotted line represents IR 26.

(P - C) represents that portion of the percentage of empty husks that varies due to nonphysiological causes and influences, i.e., the percentage of empty husks that is mainly affected by temperature. The T in equation (1) is the temperature condition that affects the percentage of empty husks, -a represents the degree of drop in the percentage of empty husks as temperature rises, i.e., the reduction coefficient of the percentage of empty husks. Because this article emphasizes the study of the effect of low temperatures on the percentage of empty husks, therefore equation (1) is meaningful in agrometeorology under conditions in which the effect of high temperatures upon the percentage of empty husks is not considered. The drop in the percentage of empty husks along with the rise in temperature is determined by the reduction coefficient a and the corresponding percentage of empty husks (P-C).

Solving equation (1) requires knowing the limits of the integrals of T and P. If the percentage of empty husks at temperature T is 100 percent, and the percentage of empty husks at Temperature T is P, then when the limits of the integral of temperature are taken as T_0 and T, the corresponding limits of the integrals of the percentage of empty husks should be taken as 100 and P, thus:

$$\int_{100}^{P} \frac{d(P-C)}{P-C} = \int_{T_0}^{T} -a\,dT$$

Integration yields

$$P - C = (100 - C)\cdot e^{-a(T-T_0)} \qquad (2)$$

Equation 2 shows the percentage of empty husks is related to the change in temperature as a negative index. If the lowest percentage of empty husks actually measured in this experiment, 5 percent, is the value of C, then equation (2) can be written as:

$$P = 95\, e^{-a(\bar{T}-T_0)} + 5 \qquad (3)$$

The results of actual measurements at each experimental location show that the variation of the percentage of empty husks with temperature changes is basically the same as equation (3). As an example, Figure 2 shows the relationship between the percentage of empty husks of the upper half panicles at Anshun in Guizhou and sliding average temperature 5 days after heading. Using the above negative index correlation equation to fit the graph yields a multiple phase correlation coefficient of 0.842. The absolute error of the fitted average is ±1.9 percent, and the correlation should be considered good.

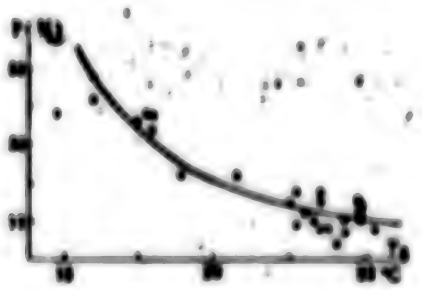


Figure 2. Correlation of Temperature and Percentage of Empty Husks (Anshun)

$P = 95e^{-0.352(\bar{T} - 16.7)} + 5$ ($n = 28$, $r = 0.842$)

When fitting the negative index correlation between temperature conditions and the percentage of empty husks, the temperature conditions are expressed by the sliding average temperature 5 days after heading (including the day of heading). The reasons are: (1) This period is about the same as the duration of the peak period of flowering of the colony; (2) Paddy rice possesses the characteristic of closing the flowers to tolerate the cold for 2 to 3 days when encountering low temperature cold damage, this standard can more rationally eliminate the effect of the characteristic of self-protection when paddy rice encounters adverse temperatures; (3) This is more convenient for conducting statistical analysis of climatic patterns. The standard of the corresponding percentage of empty husks uses the percentage of empty husks of the upper half panicle. This is because the upper half panicles are all flowers of strong growth. Their percentage of empty husks is less affected by the physiological or vegetative conditions of the plants themselves. Comparison of the percentage of empty husks of the whole panicles and the percentage of empty husks of the upper half panicles shows the relationship between the two is very close, and the correlation coefficient has reached 0.978. Therefore, using the percentage of empty husks of the upper half panicles as the standard for analysis is representative of the whole panicle.

We used equation (3) to fit the complete data of 19 experimental locations. The relationship between the percentage of empty husks (P) and the 5-day sliding average temperature ($\bar{T}_5$) of all experimental locations all showed negative indices. Of these, the results of fitting the data of 15 experimental locations passed the 1 percent F test and the results of fitting the data of 1 experimental location

passed the 5 percent F test. In this way, the index value of temperatures causing a damage of 20 percent of empty husks can be further calculated for these 16 locations according to the fitting equation (abbreviated CT_{20} value). The results of the other three experimental locations (Shanghai, Wenjiang and Shixing) did not pass the F test because the data were scattered. Their CT_{20} values were obtained by the diagrammatic method from the spot diagram (The table of the fitting results of the whole statistics is omitted).

Table 3. The Correlation Between the CT_{20} Values and the Characteristics of the Geographical Position of the Experimental Locations

Characteristics of the geographical position	Experimental location and TC_{20} values				Variation of CT_{20} Value	Average CT_{20} Value
Plains of the Middle and Lower Reaches of Changjiang	Yueyang	(22.0)	Changsha	(21.6)	20.8-22.4 (1.6)	21.7
	Xiangtan	(21.8)	Nanjing	(22.3)		
	Jurong	(22.4)	Shanghai	(22.0)		
	Jiaxing	(21.1)	Hangzhou	(21.4)		
	Ningbo	(20.8)				
Sichuan Basin	Yibin	(22.1)	Wenjiang	(22.0)	22.0-22.1 (0.1)	22.1
Yunnan and Guizhou Plateau and mountain regions	Anshun	(20.1)	Lishui	(20.7)	20.1-21.6 (1.5)	20.9
	Jinggangshan	(21.6)	Tangchun	(21.0)		
	Nanjing	(21.1)				
Region south of Nanling	Nanhai	(20.4)	Shixing	(20.1)	20.1-21.8 (1.7)	20.8
	Liuzhou	(21.8)				

(II) Pattern of Geographical Variation of CT_{20} Values

A definite difference exists among the CT_{20} values of each experimental location obtained from the standard percentage of empty husks. The greatest value was 22.4°C (Jiangsu Jurong), and the smallest value was 20.1 (Guizhou Anshun and Guangdong Shixing). The range of variation is above 2°C. Analysis of the variation of the CT_{20} values of each experimental location shows a definite geographical distribution pattern. Table 3 combines the regional position of each experimental location and the corresponding index changes. It can be seen that the index values of the experimental locations of the Sichuan Basin and the plains of the middle and lower reaches of the Changjiang are higher, averaging 21.7°C and 22.1°C; while the index values of the experimental locations in the plains south of Nanling and the Yunnan and Guizhou Plateau and mountain regions is lower, averaging 20.9 and 20.8. This geographical distribution pattern shows the cold damage index value drops with a drop in latitude and lessens at higher elevations.

To eliminate the effects of elevation above sea level and longitude, a diagram of the variation of CT_{20} under different longitudes at 12 experimental locations below an elevation of 100 meters above sea level was drawn (Figure 3). It can be seen that the CT_{20} values at the five stations of Yueyang, Changsha, Xiangtan, Shixing, Nanhai between 113-114°E show a visible pattern of becoming smaller at lower latitudes. Anshun is the experimental location of the coordination and cooperation experiment with the highest elevation above sea level. Its CT_{20} is 20.1°C, the lowest value, while the two localities of Jinggangshan and Tangchuan at the same latitude but lower in elevation by 400 to 500 meters above sea level have CT_{20} values which are higher by 1.0 - 1.5°C. Table 4 tabulated the correlation between elevation and the CT_{20} values of each experimental location north of 26°N. The results show the variation of the CT_{20} values and the average values of CT_{20} all drop at higher elevations. It needs to be pointed out that at the two experimental localities of Wenjiang and Yibin, the effects of the basin topography have weakened the effects of elevation and latitude, forming a distinctive high valued index region, therefore they have not been included in the statistics on the effects of elevation.

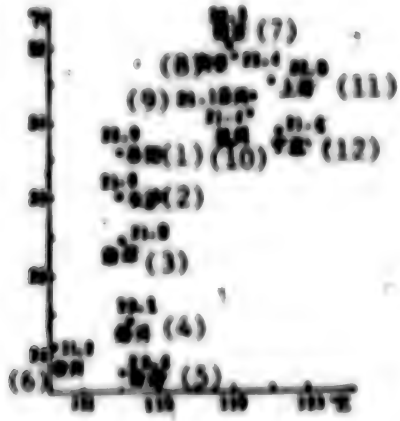


Figure 3. Variation of the CT_{20} Values of each Locality at an Elevation Below 100 Meters Above Sea Level With Latitude and Longitude

Key:

(1)	Yueyang	(5)	Nanhai	(9)	Jiaxing
(2)	Changsha	(6)	Liuzhou	(10)	Hangzhou
(3)	Xiangtan	(7)	Nanjing	(11)	Shanghai
(4)	Shixing	(8)	Jurong	(12)	Ningbo

Table 4. Correlation Between Changes in Elevation and CT_{20} Values

Elevation above sea level	CT_{20} values		Experimental locations
	Variations	Average values	
<100 meters	21.1 ~ 22.4	21.8	Nanjing, Jurong, Hangzhou, Jiaxing,
500 - 1000 meters	20.7 - 21.6	21.1	Yueyang, Xiangtang, Changsha, Tangzhou,
>1000 meters	20.1	20.1	Lishui, Jinggangshan, Anshun

III. Causes of Variations of Cold Damage Indices and Climatic Characteristics

Because the experiment has systematically considered the effects of such factors as the characteristics of the varieties, conditions of cultivation, density of the colony, methods and standards of observation and measurement, therefore it is believed that the phenomenon of variation of this type of indices along with such geographical differences as elevation and latitude should mainly be related to the weather and climatic background of these regions. Everyone knows that low temperature training during the early period of growth of crops can increase the crop's ability to resist cold. Japanese breeding workers frequently used cold water irrigation to determine the ability of paddy rice to resist low temperatures. Therefore, whether the weather and climatic conditions of each locality during the main period of growth of paddy rice are beneficial to training the crops to tolerate low temperatures should be one cause that affects the geographical differences of the indices. Secondly, according to the classification of meteorological types, cold damage can be divided into wet and cold type and clear and cold type. Different types of cold damage produce different damage to paddy rice.[7] According to the above analysis, the two physical quantities of the 10-day rate of temperature change (K) and the average daily temperature difference ($\Delta\bar{T}_{20}$) were taken into consideration. K is defined as the difference between the average temperature of the hottest 10-day period during the growth period of paddy rice and the average temperature of the 10-day period in which the CT_{20} values occur divided by the number of 10-day periods. It represents the amplitude of the drop in temperatures during the main growth period of paddy rice. A large K value means paddy rice is growing in a relatively high temperature environment before the arrival of low temperatures and training in low temperature is relatively poor, therefore the index temperature should be higher. A small K value means the opposite and the index temperature should be lower. $\Delta\bar{T}_{20}$ refers to the average temperature difference between the time 15 days before the occurrence of CT_{20} values and 5 days afterwards (a total of 20 days). The reason for using these 20 days as the time period for tabulating the average daily temperature difference is based on the fact that the period of fruiting of paddy rice that is sensitive to damage is 10 to 12 days before heading from the period of pollen mother cell meiosis to the period of heading and flowering, and $\Delta\bar{T}_{20}$ can better reflect the highest temperature and sunshine conditions during the period when paddy rice is sensitive to major cold damage. According to

the statistics of correlation between $\Delta\bar{T}_{20}$ and the average number of hours of sunshine and the highest average temperature during the same period, the correlation coefficients are respectively 0.797 and 0.660. This shows that when $\Delta\bar{T}_{20}$ is large, the highest temperature is higher during the period in which paddy rice is sensitive to low temperatures and the hours of sunshine are longer, therefore, the index temperature should be lower. The linear equation fitted from the CT_{20} values of each experimental location and the corresponding values of K and $\Delta\bar{T}_{20}$ is:

$$CT_{20} = 20.66 + 0.69K - 0.045\Delta\bar{T}_{20} \quad (r = 0.721,\ n = 19)$$

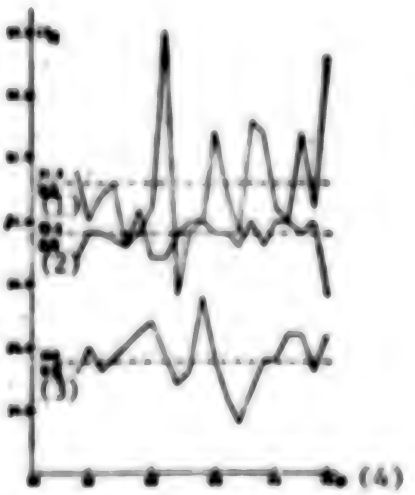
Calculations of the equation show (Table 5) that except for the four localities of Jinggangshan, Anshun, Shixing and Yibin which have an error larger than 0.5°C, the errors of all other localities are all within the 0.5°C range. The average absolute error is ±0.374°C. This shows that the differences of the indices of each locality in 1979 were caused by the differences in the values of K and $\Delta\bar{T}_{20}$ of these regions to a large degree.

Summarizing the above analysis, it can be preliminarily believed that the regional differences in the autumn cold damage indices for 1979 are caused by the differences in the weather and climatic conditions of each locality. The summer in the plains of the middle and lower reaches of Changjiang and the Sichuan Basin is hot, the value of K is large (averaging 1.9), not favorable to the training of paddy rice to tolerate low temperatures. When the temperatures drop in autumn, the two localities have more overcast and rainy weather, sunshine is deficient, the value of $\Delta\bar{T}_{20}$ is lower (averaging 6.5°C), thus forming a high value region for the cold damage index. The mountain regions are affected by elevation. Temperatures in summer are lower, changes in temperature are also relatively slow and even, the value of K is visibly smaller (averaging 1.0), the daily temperature difference is larger (averaging 7.9), beneficial to a lowering of the CT_{20} value. In the southern coastal regions, the value of K in 1979 was not high, averaging 1.3, while $\Delta\bar{T}_{20}$ visibly increased (averaging 12.9°C). Therefore, the southern coastal regions and the mountain regions formed a low value region of the cold damage index.

Based on the preliminary analysis above, the values of CT_{20} of each year at each locality can be forecast from the values of K and $\Delta\bar{T}_{20}$ of the previous years. Figure 4 shows the variation curves of the CT_{20} values of each year from 1959 to 1978 at the three localities of Jiangsu Nanjing (representing the region of the plains of the middle and lower reaches of the Changjiang), Guangdong Nanhai (representing regions of low latitudes of the south) and Guizhou Anshun (representing the plateau mountain regions). It needs to be pointed out that when calculating the values of K of each year for the three localities above, the differences in the climates of the coastal and mountain regions have caused the extreme occurrences of a maximum of 13, 10-day periods and a minimum of one 10-day period in the number of continuous 10-day periods between the 10-day occurrences of the hottest 10-day average temperatures and the index temperatures in Nanhai and Anshun. According to the biological significance of the value of K, we made appropriate corrections. For the years in which the number of continuous 10-day periods was too large, the actual average number of 10-day

Table 5. Results of Calculations of CT_{20} Values

Experimental location	Value of K	Value of ΔT_{20}	Forecast value of CT_{20}	Actual value of CT_{20}	Error
Nanjing	3.0	8.6	22.4	22.3	+0.1
Jurong	2.7	5.2	22.3	22.4	-0.1
Shanghai	2.1	6.0	21.8	22.0	-0.2
Jiaxing	1.2	7.3	21.2	21.1	+0.1
Hangzhou	1.8	6.3	21.6	21.4	+0.2
Ningbo	1.1	7.1	21.1	20.8	+0.3
Yueyang	2.3	5.7	22.0	22.0	0.0
Changsha	2.1	6.7	21.8	21.6	+0.2
Xiangtan	2.2	6.1	21.9	21.8	+0.1
Jinggangshan	0.7	7.6	20.8	21.6	-0.8
Anshun	0.8	6.7	20.9	20.1	+0.8
Tangchuan	1.0	7.4	21.0	21.0	0.0
Shixing	1.2	9.1	21.1	20.1	+1.0
Nanjing	0.7	9.8	20.7	21.1	-0.4
Nanhai	0.9	12.7	20.7	20.4	+0.3
Yibin	1.0	6.0	21.1	22.1	-1.0
Wenzhou	1.7	7.0	21.5	22.0	-0.5
Liuzhou	1.7	13.0	21.3	21.8	-0.5
Lishui	1.1	7.0	21.1	20.7	+0.4



Key:

(1) Nanjing
(2) Nanhai
(3) Anshun
(4) Year

Figure 4. Variation of Cold Damage Index Values Between Years

periods (six 10-day periods) needed from the time of transplanting of paddy rice to the time of heading was used. For the years in which the number of continuous 10-day periods was too small, the key period for training the paddy rice in low temperatures is considered and the number of 10-day periods required from the time of young panicle differentiation to heading (three 10-day periods) was taken. Analysis of Figure 4 shows:

(1) The index temperatures of the three localities over past years show visible regional differences: Nanjing has the highest average value of 21.3°C. Nanhai is second with an average value of 20.9°C. Anshun is the lowest with an average value of 19.9°C. This shows a similar pattern of geographical differences in the indices for 1979, and it also exists in temporal distribution. From the climatic point of view, it is also relatively stable. But, the differences in the average values of past years in Nanhai and Nanjing are visibly smaller than 1979, the former is 0.4°C and the latter is 1.9°C. Analysis of the weather characteristics of the two localities in 1979 shows that clear cold type weather rarely seen in the history of the locality in Nanhai occurred. The average daily temperature difference reached 12.7°C, higher than the average daily temperature difference of past years of 7.7°C by 5°C. Thus, the index value visibly dropped. This shows the occurrence of low values in the South China coastal regions is not a usual climatic pattern.

(2) For the actual years, the differences in the indices of Nanjing and Nanhai in 1966 reached 1.8°C, while in 1963, the index values of the two localities were equal, in 1967, the value at Nanjing was lower than that at Nanhai by 0.3°C. Similarly, the differences between Nanhai and Anshun in 1979 was only 0.3°C, while in 1973 the difference was 1.4°C. Therefore, the actual index values of different years of each locality are also relatively unstable. The value is greatly affected by the weather conditions in that year. This shows that when determining the actual cold damage index, comprehensive consideration must be given to the climatic characteristics of each locality and the weather conditions of that year.

The amplitude of variation of autumn cold damage indices between years at the three localities was the greatest at Nanjing (2.1°C), followed by Anshun (1.0°C), and the least at Nanhai (0.7°C). Obviously, this variation between years is closely related to the characteristics of the strong continental climate at Nanjing, the strong oceanic climate at Nanhai and the effects of altitude above sea level at Anshun.

Because the joint experiments were conducted only for 1 year, the distribution of the localities was not completely rational, therefore this article presents only a preliminary understanding of the pattern of the indices. The conclusion of this experiment requires further proof and further experimental study.

By the way, this article summarized and analyzed materials from 19 experimental locations. This is because the fruiting percentages of the crops at the three localities of Hunan Guidong, Henan Guangshan and Guangxi Nanning were affected by drought and overcast and rain or disease and insect pests during the period of the experiment and they were not included in the summary and analysis. The experimental data at Jiangxi Shangyou show that even under a low temperature of 18°C, the fruiting percentage was still normal, inconsistent with the results of the majority of the experimental localities. The reason requires additional research.

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CSO: 4007

BRIEFS

COUNTY AGRICULTURE--Tianchang County, Anhui has top-dressed its 350,000 mu of wheat and 150,000 mu of rape and has begun preparations for cultivating rice seedlings on 40,000 mu and preparations on 100,000 mu of cotton. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 13 Mar 81 OW]

COUNTY WATER CONSERVANCY--Hefei, 11 Mar (XINHUA)--In the month and more since winter repair work started, Wuwei County has completed work on increasing the heights and widths of 255 dikes and repaired all of the more than 400-li dikes which had 88 critical breaches caused by last year's flood. The projects involved 210,000 civilian workers and 5.48 million cubic meters of earth work. Situated by the banks of the Changjiang, the county's river bank farmlands account for 80 percent of its total cultivated land. When the county was hit by flood last year, 1 million of the river bank farm fields were waterlogged. At the same time, the county is actively preparing for spring farming and carrying out field management for its more than 1 million mu of wheat, rape and green manure. [Beijing XINHUA Domestic Service in Chinese 0123 GMT 11 Mar 81 OW]

PREFECTURE GRAIN PRODUCTION--The 1980 year-end distribution has been mainly completed in Anhui's Chuxian Prefecture. The total grain output reached 3,217 million jin, or a 13.6-percent increase over 1979. The output of oil-bearing crops reached some 150 million jin, or a 52.9-percent increase. As of the end of January, some 679 million jin of grains had been stored, accounting for 189 percent of the grain purchase plans and increasing by some 189 percent of the grain purchase plans and increasing by some 119 million jin over the same period in 1979. The amount of oil-bearing crops stored reached some 28 million jin, accounting for 333.4 percent of the plans. The 1980 distribution for commune members in rural areas of the prefecture amounted to 303 million yuan, accounting for 60.1 percent of the total income, with the per capita income increasing from 82 yuan in 1979 to 103 yuan. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 15 Mar 81 OW]

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BRIEFS

SPRING FARMING--Preparations for 1981 spring farming are in full swing in Fujian Province's rural areas. Since the spring festival, nearly 10,000 cadres have been working in rural areas to assist the communes, production brigades and teams in establishing or perfecting the system of responsibility in production. Most communes have by now established their own responsibility system and mapped out 1981 agricultural production plans. Sown acreage under food grains is expected to reach 31 million mu while there will also be an increase in the acreage sown to sugarcane and tobacco in 1981. The province has by now planted some 720,000 mu of sugarcane, peanuts and soybeans. [Fuzhou Fujian Provincial Service in Mandarin 1035 GMT 15 Mar 81 OW]

FUJIAN COUNTY FOREST--As of 4 March, Taining County Fujian, had planted 30,100 mu of timber and economic forests, overfulfilling this year's afforestation plan. [Fuzhou Fujian Provincial Service in Mandarin 1035 GMT 13 Mar 81 OW]

FUJIAN PREFECTURE AFFORESTATION--As of early March, Jianyang Prefecture, Fujian had afforested 410,000 mu of land, and Songxi County had afforested 31,000 mu of land. [Fuzhou Fujiang Provincial Service in Mandarin 1035 GMT 13 Mar 81 OW]

SUGARCANE GROWING--Xianyou County, one of the major sugarcane-producing areas of Fujian, plans to grow 125,000 my of sugarcane in 1981. As of 15 March, the county had applied scientific farming techniques to some 60,000 mu of sugarcane fields and planted 40,000 mu of fields with seeds of fine strains. [Fuzhou Fujian Provincial Service in Mandarin 1035 GMT 15 Mar 81 OW]

CSO: 4007

COMMENTATOR STRESSES AGRICULTURE POLICIES WHEN LOOKING AT 1981

Guangzhou NANFANG RIBAO in Chinese 20 Jan 81 p 1

[Article by the Newspaper's Commentator: "Further Need To Rely on Policies"]

[Text] In 1980, Guangdong Province had an all around bumper harvest in agricultural production. Will a new breakthrough occur in 1981? Will the livelihood of the farmers continue to improve? The Nanhai County CCP Committee summarized past experiences and analyzed the current trends in the thinking of the masses to conclude that if only the series of programs and policies since the Third Plenary Session of the 11th Party Central Committee continue to be carried out, and if there is continued support for effective measures to enliven the economy of rural villages, further advances can be made along the road of high output and prosperity. This analysis by the Nanhai County CCP Committee matches realities in rural villages, and is correct.

At the present time, China is in the process of further readjustment of the national economy. This readjustment consists principally of retrenchment of capital construction and a tightening of administrative expenses. In the realm of agriculture, however, the issue is entirely active forward movement. During this period of readjustment, the country naturally cannot now increase investment in agriculture. For agriculture to advance, it must rely on policies and rely on science. For the development of agriculture, essential investment will have to be made, but investment by the state has its limits, particularly during the period of readjustment, and it cannot be greatly increased. Meanwhile, the role in rural villages of a series of programs and policies from the Central Committee is enormous and hard to estimate. Now that the party's policies have been passed to the masses, the masses have gone into action, which can become a huge material force in overcoming difficulties. This point came through most forcefully in Nanhai.

As a result of the influence of "leftist" errors in the past, Nanhai County's agricultural production has languished for a long time. During the 10 year period from 1966 to 1976, increases in grain yields throughout the county averaged only somewhat more than 1 jin per mu annually. Following the smashing of the "gang of four," and particularly since the Third Plenary Session of the 11th Party Central Committee, they have gradually divested themselves of the fetters of "leftist" thinking to implement a series of rural village economic policies, and agriculture, industry, and sideline occupations have strode along. For 2 years in a row, the

county has enjoyed extensive increases in output and earnings. Grain yields have risen from more than 1200 jin per mu in 1978 to more than 1400 jin last year, and average distributions to commune members increased from somewhat more than 180 yuan to more than 300 yuan in a continuance of the county's leading position in the province. This fact strongly attests to the correctness of the spirit of the Third Plenary Session and manifests the enormous power of policies. The power of policies currently has great room for maneuver not only in Nanhai, but in every county (or municipality) in the province. Giving full play to the power and potential of policies for further arousal of the initiative of the broad masses of the peasants is the major assurance this year for the continued advance in Guangdong Province's agricultural production.

Nevertheless, by no means all comrades have a correct understanding of the power of policies. Some comrades, despite their profound realization of the goodness of policies, are nevertheless fearful that policies will change and that the good times will not last long. Such a state of mind is still rather pervasive even in places where the implementation of policies have had resounding successes, and it recurs over and over again. We must take adequate account of the lingering influence of these "leftist" mistakes. We must diligently intensify political ideological work, widely and penetratingly carrying out further education of the cadres and the masses about the spirit of the Third Plenary Session so that the peasants will overcome their mentality of "fear of change," and "fear of pullback." "Medicine that can calm" must be given them. At the same time, political ideological work, economic means, and economic measures must be closely correlated to give the peasant masses material benefits that they can see and touch so that their initiative will be able to persevere.

The Nanhai County CCP Committee understands this unitary political and economic rationale. While intensifying political ideological work, they diligently put into practice the programs and policies of the party. On the one hand they have gone into joint county, commune, and production business to set up combined companies for agricultural byproducts, and done a good job of procurement of products at negotiated prices after quotas have been exceeded to prevent "lowering of the value of grain that hurts the farmers." They have returned part of profits to production teams to preserve the farmers' enthusiasm for doing a good job in agriculture, particularly in the production of grain. On the other hand, they have given vigorous impetus to coalition to support production team economies and to buttress this production team foundation so as to allow farmers to broaden avenues to increase their incomes, so long as they maintain steady increases in grain output. In this way, they combine political activity with economic activity, the farmers thereby gaining greater material benefits that greatly arouse the enthusiasm of the masses for production and quicken the pace toward the prosperity of rural villages.

How to make the farmers prosperous in the shortest possible time is still a central problem in rural villages. China is a country with 1 billion population of whom 800 million are farmers. A good life for the farmers has extremely great pertinence for the stabilizing the entire situation, and for the smooth readjustment of the national economy. We hope that comrades in rural villages everywhere will consult Nanhai County's successful experiences in seeking truth from facts, in emancipating the mentality, and in leading the farmers to date to become properous and to take action to become prosperous, to continue the purge of the ultraleft

pernicious influence of "to be wealthy is to be revisionist," and diligently check on the implementation of the party's policies, to see what it is that is not helpful to production. Then they should straightaway further implement the two Central Committee documents on agriculture and the Central Committee's instructions on strengthening and improving a system of responsibility for production, constantly improve administration and management, make the most of local advantages, and use every manner of means to win a new bumper harvest in agriculture this year so that the farmers will become prosperous in the shortest time possible.

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CSO: 4007

PERFORMANCE OF GUICHAO RICE HAILED

Guangzhou NANFANG RIBAO in Chinese 22 Jan 81 p 1

[Article by Zhou Xun [0719 6598]: "Let 'Guichao' Make New Contributions to Winning Bumper Harvests in Agriculture; Leading Farm Cadres, Scientists, and Technicians From Inside and Outside the Province Promote Their 'Guichao' Experiences at Hua County Symposium"]

[Text] Last year the rice growing areas of South China promoted the planting of "Guichao" superior variety rice on more than 20 million mu, and an overwhelming majority of prefectures reaped bumper harvests from it. Yields increased by 50 or 60 to more than 100 jin per mu over those obtained from the dominant local superior varieties, making a contribution to winning increased grain output. By way of summarizing and exchanging experiences in the growing of "Guichao," as well as to analyze the characteristics of the specie, and to solve scientific and technical problems in its promotion, more than 40 leading cadres and technicians in agricultural and scientific units from everywhere in Guangdong, and from Guangxi, Sichuan, and Hubei recently conducted a symposium at Huadong Commune in Hua Country. The noted paddy rice breeding expert, Huang Yaoxiang [7806 5069 4382] made a speech at the meeting on the topic, "Dialectic Method of Growing Guichao."

In the spirit of experience in agricultural production being the sole standard for testing superior varieties, and making full use of academic freedom the meeting made summaries in a seeking of truth in facts as manifested in output of "Guichao." They unanimously agreed that since the breeding of "Guichao" in 1976, the testing that it has undergone during the past 4 years in eight crops grown under different natural conditions and different conditions of production has demonstrated its broad adaptability, its fine bumper output performance, and its remarkable results in increasing output, and that it is the finest of all current conventional superior rice varieties in its bumper output performance. Last year Guangdong Province planted "Guichao" on 16 million mu as the early and the late crop, from which yields averaged from 60 to 80 jin per mu increases over other superior varieties. Last year, Wenjiang Prefecture in Sichuan Province planted 1.2 million mu of it for yields averaging 846 jin per mu, or yields of 80 jin per mu more than from other superior varieties, and for a total increase in output of 88 million jin. Last year Qinzhou Prefecture in Guangxi Province planted 1.08 million mu of "Guichao" as early crop for average increases in yields of 133 jin per mu, and an increase in total output of more than 140 million jin or 60 percent of the increase in output from early rice for the whole prefecture.

While affirming the superior characteristics of "Guichao," the meeting also made diligent analysis of its shortcomings and of the lessons learned from its failure when planted in a small number of areas. They felt "Guichao's" main shortcoming to be weakness in resistance, specifically manifested in a tendency toward tallness in early crop plants with attendant lack of resistance to lodging. A second shortcoming is the tendency, when fertilized in mid-season, to become prone to bacterial blight. Third is proneness to red withering during the early stage of the late crop when temperatures are high, or when it has been planted too deeply, or when potassium is lacking. Fourth is poor seedling resistance to coldness in the early crop, and fifth is a thin husk with a proneness to sprouting in the early crop's late stages if protracted rain occurs. Of the several shortcomings, the greatest are lodging, sprouting, and bacterial blight. Consequently, when being extended in cultivation, attention must be given to adapting general methods to specific situations, and to employing growing techniques that match the characteristics of "Guichao" variety, to exploit advantages and avoid disadvantages as the only way to derive optimum results in increased output. The meeting summarized the experiences of various areas and put forward 11 measures for scientific planting of "Guichao." Additionally, it called for diligent rejuvenation and purification of "Guichao," and active experiments and breeding so as to gradually replace and select for use a strain that is superior to the "Guichao No 2" currently being promoted. In this regard, Hua County, which was the earliest to promote the growing of "Guichao," has moved forward. After harvesting increased output from its continuous promotion for a period of 3 years, they discovered a great accumulation in sources of bacteria and a tendency for bacterial blight to develop widely. Since last year, therefore, they began to introduce "Guichao No 13" for experimental plantings. Last year, more than 23,000 mu of it was grown as the late crop throughout the county for average increases in yields of from 40 to 60 jin per mu more than for "Guichao No 2." They have already decided to switch to "Guichao No 13" as the dominant variety to be planted for their early and late crops, while at the same time mulling the problem of a successor variety for "Guichao."

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CSO: 4007

EXPANSION OF HYBRID RICE PLANNED

Provincial Plans, Advice

Guangzhou NANFANG RIBAO in Chinese 18 Feb 81 p 2

[Text] Hybrid rice has been test planted and extended in cultivation in Guangdong Province over a period of 5 years in which the crops have been harvested. Each year the planted area has gradually expanded, and the role of hybrid rice in increased output has been ever more evident. It has played a definite role in increasing both per unit grain yields and total grain output in Guangdong Province. Last year's planting of 2.2 million mu of hybrid rice throughout the province produced increased output that was universally better than that obtained from conventional varieties. Recent reports from all prefectures show that this year planting of hybrid rice throughout the province will be 5 million mu, for an almost 1.5 fold increase over last year. This has major significance for increasing Guangdong Province's per unit yields, for increasing total grain output, and for readjustments in the crop pattern. On the basis of experiences in the planting of hybrid rice in every prefecture during the past several years, several ideas are presented here for the consideration of all production units concerned about the growing of hybrid rice this year.

1. Selection of superior combinations for planting that are suited to the local area. Guangdong Province has, at one time or another, test planted Nanyou, Aiyou, Weiyou, and Shanyou combinations containing three lines, and experience has shown that Shanyou Nos 2, 3, and 6, and Weiyou Nos 2, 3, and 6 produce high output, have broad adaptability, are resistant to disease and produce consistent output. They are suited to natural conditions in Guangdong Province, and are the current favored superior combinations. For the early crop, Shanyou Nos 2 and 3 and Weiyou Nos 2 and 3 should predominate. For the late crop, Shanyou No 6 and Weiyou No 6 should predominate. Each locale should adapt general methods to local situations in selecting them for use.

2. Mastery of the suitable sowing and transplanting times will assure certain output of hybrid rice. For the early crop, arrangements should be made for sowing between mid-February and early March. In the south and in places that use plastic sheeting to cover the ground, sowing may be done somewhat earlier. The seedling period if from 30 to 35 days with largescale transplanting taking place around "Qingming" [5 April]. Ripening will be complete before 15 July. Thus, full use may be made of light and temperature conditions between the heading and ripening stages both to win a bumper harvest from the early crop, and to have a head start

on output from the late crop. For late crop hybrid rice, sowing is usually best done toward the end of June or early July. Transplanting should be complete before the end of July and no later than the first part of August. Harvesting takes place at the end of October. This both helps avoid cold damage and the reaping of high output, and also helps winter planting.

3. Propagation of strong seedlings with many tillers to lay a foundation for high output. When hybrid rice is transplanted, each clump should contain only one or two seedlings with high output deriving from tillering and heading. When there are numerous tillers and a large number of effective heads, the total number of grains will also be numerous and output will be high. Therefore, propagation of strong seedlings with many tillers is the key to winning high output. The criteria for judging strong seedlings that tiller are: sturdy main stems that have two or more tillers with the tiller nodes in a low position on the stems; two or more leaves; well-developed root systems; dark green leaf color; and no disease or insect infestations. To propagate sturdy seedlings with numerous tillers, good seedlings must be selected, and plenty of base fertilizer applied to assure quality seedling fields. Second, the seedling propagation method of sowing seeds on a moist field and propagating them on a moist field or sowing them on a watery field and propagating them on a moist field should be used. For early sowing of seeds for early crop rice, plastic sheeting should be used on the seedling propagation fields. Third is making sure to sow lightly and evenly. For the early crop, seeds should be sown at the rate of between 20 and 30 jin per mu; for the late crop it should be from 15 to 25 jin per mu. Following seeding, sprouts should be covered with dirt. Fourth is increased attention to fertilizer and water management with timely applications of fertilizer for the young rice seedlings, a second application of fertilizer to the rice seedlings before transplanting, fertilizer to strengthen the seedlings, and a final application to the seedlings about 5 days before transplanting. With regard to draining and irrigating seedling fields, after sowing and before the formation of the fourth leaf, the surface of the seedling bed should be kept moist and water should usually be in ditches around the seed bed to help in the absorption of fertilizer by the seedlings and to promote tillering. After the four leaf stage, conditions on the surface of seedling beds should be alternated between wet and dry to firm up the seedlings and make them strong.

4. Reasonable close planting, keeping soil around the roots while transplanting and transplanting shallowly. The growing of hybrid rice requires both making the most of the advantages of individual plants and achieving a fine colony structure. Experience in various places has shown that individual plants should be set between 4 and 5 cun apart, and rows should be 6 or 7 cun apart. Seedlings should be scooped up and transplanted shallowly in groups of two plants each, transplanting between 60,000 and 70,000 seedlings per mu. This helps both the coordinated development of plant colonies and individual plants, laying a good foundation for increase in the number of panicles and the number of grains in each panicle.

5. A good job of field care centered around watering and fertilizer application. Hybrid rice's bumper output properties are high, but high output requires suitable increase in the amount of fertilizer applied. In tests, yields of 1,000 jin per mu required between 20 and 25 jin of pure nitrogen. For yields of more than 1,200 jin per mu, between 28 and 30 jin of pure nitrogen were required. Furthermore, it is necessary to use nitrogen, phosphate, and potassium in combination.

Proportions vary owing to different soil quality in various areas. In the application of fertilizer, attention should be given to heavy applications in the early stage, early application of tillering fertilizer, and between 70 and 80 percent of the fertilizer being applied within the first 20 days following transplanting so that tillering nodes will form at a low point on the stems in order to attain the objective of a sufficient number of stems early on. Once the number of stems in the entire field totals around 200,000, application of fertilizer should be controlled in combination with airing and light sunning of the fields so as to inhibit formation of an excessive number of ineffective tillers. During the mid period of growth, fertilizer applications should consist mainly of potash and phosphate to strengthen the seedlings and promote large panicles. Quantity of fertilizer given at this time should be about one-tenth the total quantity of fertilizer applied. During the late stage, attention should be given to the nurture of roots and the protection of leaves to prevent premature decline. Proper application of panicle and grain fertilizer plays a role in promoting a protracted effective leaf life, in increasing the fruiting rate, and in increasing output. Total quantity of fertilizer in the late stage is about one-tenth the total in the case of the early crop; it may be suitably increased for the late crop. Nitrogenous fertilizer should not be applied during the late stage; otherwise disease and insect infestations will increase. The following must be done in the matter of drainage and irrigation: shallow water on the field in the early stages for regreening of the seedlings, and moistness for tillering. Airing and sunning of the fields once sufficient stems have been obtained in the mid period. For most fields, there should be much airing and light sunning, but in the case of waterlogged fields, poorly drained fields, and cold and low-lying fields, the airing should be done early, and the sunning should be heavy. Particular care should be taken to prevent a cut off of water too early in the late period so as to avoid impairment of the fruiting rate and consequent decline in the per thousand weight of grains.

6. A good job of prevention and control of disease and insect infestations, with emphasis on prevention. This is a way to assure high output. The basic effort should go into prevention and control by doing a good job of fertilizer and water management to which should be added prevention and control through the use of pesticides.

Zhanjiang Prefecture Plans

Guangzhou NANFANG RIBAO in Chinese 18 Feb 81 p 2

[Text] On a recent visit to Zhanjiang Prefecture, I heard quite a few discussions of problems about hybrid rice. The majority view was that the growing of hybrid rice is a major step in getting bumper grain harvests.

These assessments very much fit the facts.

Last year two crops of hybrid rice were grown on almost 500,000 mu in Zhanjiang Prefecture. This amounted to better than 4 percent of the total area sown, but the contribution to increased grain output that it made was very great. Almost 150,000 mu of hybrid rice was planted throughout the prefecture in last year's early crop for average yields of 877 jin per mu and a harvest of between 150 and 250 jin

per mu more than the output of conventional varieties used locally. More than 300,000 mu of hybrid was planted in the late crop for average yields of 806 jin per mu. As a result of natural disasters, output from conventional varieties was far from ideal, so hybrid rice gave a really good account of itself with per mu yields amounting to about 300 jin per mu more than from conventional varieties. The Xieji, Zaojiang, Shiban, and Mutoutang communes in Gaozhou County, which had fairly high per unit yields to begin with (annual yields being around 1,200 jin per mu), last year planted a total of more than 10,000 mu of hybrid rice. The resulting per unit yields and total output both showed large increases, the least being about 20 percent and the most being about 30 percent and more. It may be said that no matter the place, good harvests of hybrid rice were reaped. Hybrid rice has the fine quality of not only producing high output, but its growing season is also relatively short; consequently rotational cropping arrangements are easier. This is particularly true in the case of the late crop. The current dominant varieties are "laobao" (Baoxuaner, Baotaibai, and Dalingai) for which the growing period is 130 days, which greatly hurts prefectures that customarily plant sweet potatoes in the winter. But "Shanyouliu" and such hybrids, may be harvested around the time the "hoar frost descends" [23 Oct], allowing for the planting of sweet potatoes 20 days earlier, which is helpful to sweet potato growth.

It is for these very reasons that the interest in growing hybrid rice of the peasant masses of Zhanjiang Prefecture has become greater and greater. On the basis of arrangements made in each county of the prefecture, plans call for the planting in 1981 of about 3 million mu of hybrid rice throughout the prefecture, which is 20 percent of the total seeded area. If this move is made, a great breakthrough will have been made in rice output in Zhanjiang Prefecture. During the past 2 years, Zhanjiang Prefecture's rice output has increased by more than 1 billion jin, and hybrid rice will be truly of great importance in making further advances from this foundation. All the seeds needed to plant a planned 1 million mu of early crop hybrid rice have been made ready. Various measures are also in train to amass the seeds needed for the late crop. In addition, using the county as the organizational unit, they have done large scale training of technical forces, mostly the training of commune, production brigade, and production team cadres and farmer technicians in the planned training of 200,000 people. The needed chemical fertilizer has also been amassed.

To be sure, doing a good job in the growing of hybrid rice is not such an easy matter. Here lies a problem not only in how to keep up with techniques, but some meticulous conceptual work must be done too. Under present circumstances, a great imbalance exists in the promotion of hybrid rice by various counties. For example, some counties plan on growing 600,000 or 700,000 mu of hybrid, while others plan only for less than 100,000 mu or several thousand mu. Those counties that are not growing much of it feel that, 1. seed propagation is a nuisance; 2. past experiences with "Nanyou" were less than ideal so they don't want to be bothered any further; 3. some low output areas feel that no matter what variety they grow, they get 400 jin from a crop, so hybrid rice will not necessarily produce any more; 4. some areas feel that it is hard to get rich quick by relying on grain and not as good as investing the labor in sideline industries; and 5. coastal areas emphasize the numerous typhoons and poor natural conditions that make the growing of hybrid unsuitable. These conceptual problems require further concrete analysis.

In places where conditions exist for the promotion of hybrid rice, representative demonstrations would be used in education efforts designed to convince, so that the masses will see advantages from actual practice and grow hybrid rice of their own accord, and thus a solid conceptual foundation will be laid for the large scale promotion of hybrid rice.

Shaoguan Prefecture

Guangzhou NANFANG RIBAO in Chinese 21 Feb 81 p 1

[Text] Editor's Note: Superior varieties are the internal causes of increased grain output. All measures and conditions for increases in output involve the use of seeds to play their role. In relying on superior varieties, investment is small and benefits are great. The reality of increased rice output for 4 years in a row from the large scale promotion of hybrid rice in Shaoguan Prefecture powerfully demonstrates this principle. It is hoped that every prefecture will summarize the successful experiences of that prefecture, adjust general methods to their specific situations and promote cultivation of hybrids and superior varieties such as "Guichao" to strive for a new breakthrough in this year's agricultural production.

Hybrid rice has a rather strong growth heterosis and effectiveness in increased output. This point is already well known by comrades in many prefectures, particularly in northern mountain regions of the province. Grown as a late crop, hybrid rice ripens early, has strong resistance, and high output, which are greatly helpful in avoidance of the "cold dew wind." Then why is it that in some places where conditions favor its promotion, it has not yet been given general promotion. According to reports, one reason is that comrades in these places believe hybrid rice seed propagation is difficult. Shaoguan Prefecture's experiences have shown that as long as leaders take the lead in learning seed propagation techniques, participating in the practice of propagating seeds with technicians and the masses, the problem of "difficulties in seed propagation" can be solved. They gradually build a growing and seed propagation system from the prefecture down to the communes and production brigades, while at the same time implementing price policies to protect the enthusiasm of seed propagation units, finally guaranteeing the requirements for year after year development of hybrid rice.

Last year Shaoguan Prefecture grew more than 1.18 million mu of hybrid rice for yields averaging 615 jin per mu, higher by 135 jin than conventional rice varieties. These 1.18 million mu accounted for 19.8 percent of the total rice growing area, yet they accounted for 70 percent of the total increase in grain output. After three consecutive years of increased rice output throughout the prefecture, output continued to increase to more than 32 million jin over 1979.

Shaoguan Prefecture is located in the northern part of Guangdong Province where the "cold dew wind" comes early. The classical late crop conventional varieties planted in the past were strongly photosensitive varieties, which could form panicles only in short hours of daylight, and frequently they were seriously threatened by the "cold dew wind," which when light caused reduced outputs, and when severe resulted in no grain to harvest. For the past several decades, the farmers of the northern

Guangdong highlands have been hard pressed to find a superior late crop variety that could beat the "cold dew wind." Inasmuch as the photosensitivity and heat sensitivity of hybrid rice varieties is moderate, given a certain effective accumulative temperature, they will form panicles.

That is to say when sown early and transplanted early, they will head early and ripen early. This is far superior to using classical late crop varieties of strong photosensitivity. When sown at the proper time, they are able to make fullest use of the light and heat resources of July, August, and September to ripen early and produce high output, effectively avoiding the "cold dew wind." In order to reverse the passive situation in late crop production, beginning in 1975, Shaoguan Prefecture started to introduce and promote cultivation of hybrid rice.

Scientific measurements have shown hybrid rice to possess a fairly strong growth heterosis. However in order to make the most of this heterosis, special care must be taken with scientific planting. Consequently, all locales in Shaoguan Prefecture have vigorously taken in hand the following four matters.

1. Selection of highly superior combinations. In the process of selecting combinations, Shaoguan Prefecture has grown "Aiyou" and "Nanyou." But "Aiyou's" heterosis for high output was somewhat poor; it was sensitive to heat; and it lacked sufficient adaptability. Though "Nanyou" had some good heteroses and ripened rather early, its resistances were low, being particularly unable to resist rice blast. So, in 1978, both of them were eliminated to be replaced by combinations more ideal in terms of bumper output, constant output, adaptability, and resistance, namely "Shaoyou" and "Weiyou." Subsequently, hybrid rice took root in northern Guangdong, and the more it has been grown, the better it has become.

2. Attention to purity and output of seeds. The seeds of hybrid rice differ from those of conventional rice. They must be propagated in the first year, put into production in the second year, and planted in open fields only in the third year. Additionally, only single plants are transplanted, reliance being placed on tillering and head formation for high output. Thus seed purity must be high and there must be a sufficient quantity of seeds. In order to suit these requirements, after several years of effort Shaoguan Prefecture has preliminarily formed a "prefectural purification system (in which the prefecture is responsible for purification and rejuvenation, and production of three-line pure breeds), a county propagation system (in which the county propagates three-line parent breeds), a commune production system (in which communes are responsible for unified production of seeds), and a brigade use system (in which the brigades provide the seed to production teams for planting). Additionally, a pricing policy was formulated that is able to take care of the interests of the production units and the seed using units. Also instituted was a contract system, a link-up system, and use of channels to safeguard the enthusiasm of seed producing units.

3. Rational provisions for a crop pattern. In response to the reaction of hybrid rice to light and heat, and to the climatic conditions of Shaoguan Prefecture, emphasis was placed on the use of hybrids for the midseason and late season crops. The principle was early crop creation of conditions for active growing of hybrid; growing of hybrid entirely as the midseason crop, and mostly growing of hybrid for the late crop. In last year's planting of 1.18 million mu of hybrid rice throughout

the prefecture, for the early crop only about 170,000 mu was planted to hybrid. The rest of the acreage was planted in hybrid for the midseason and late crops. Practice has shown that such an arrangement both makes the most of the advantages of hybrid rice, and can also change the situation in northern Guangdong prefectures of low and inconsistent outputs from the late crop.

4. Launching of experimental research on planting techniques for high output with constant improvements in levels of management in growing hybrid.

This year, the prefecture plans to grow 2 million mu of hybrid rice, of which 500,000 mu will be grown as the early and midseason crop. The seeds have already been made ready, brought into position, and some places have already begun sowing.

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CSO: 4007

CONTINUOUS CROPPING OF PEANUTS, RICE IN LOW YIELDING FIELDS URGED

Guangzhou NANFANG RIBAO in Chinese 26 Jan 81 p 3

[Article by Correspondent Huang Xiangguang [7806 4382 0342], "Numerous Advantages From Use of Low Yielding Fields For Continuous Cropping of Peanuts and Rice"]

[Text] Guangdong is a province with few fields relative to the number of its people, and if the problem of feeding the more than 50 million people in the province is to be solved, it will be necessary, first of all, to assure steady growth in grain output while at the same time making the most of advantages for large scale growing of economic crops that increase the earnings of the peasants. How can this be done? Use in quite a few prefectures of low yielding fields for the rotational cropping of peanuts and rice has been a good way of getting bumper harvests of both grain and oil seed plants.

In Guangdong Province, low yield fields with an annual yield of under 800 jin per mu account for possibly as much as 15 million mu. When numerous prefectures have used rotational cropping of peanuts with rice to transform these low yield fields, results have been astounding. Surveys done in Huiyang Prefecture have shown that when continuous cropping of peanuts and rice was done on low yield fields with annual yields of less than 600 jin per mu, a single crop would yield the annual amount of grain, and an additional 200 to 300 jin of peanuts could be harvested. When moderately productive fields with annual yields of about 800 jin per mu were continuously triple cropped with peanuts, paddy rice, wheat, or tuber crops, grain for the entire year could likewise be obtained, plus a harvest of 200 to 300 jin of peanuts. High output fields with yields of more than 1000 jin per mu were continuously triple cropped in a "peanuts-rice-rice" or a "peanuts-rice-tubers" pattern. The usual total grain output would either be maintained or slightly increased, and a crop of peanuts would be harvested as well. Last year Huiyang Prefecture rotated peanuts and rice on more than 500,000 mu of low yielding fields. Despite a 400,000 mu reduction in the area sown, total paddy rice output increased by 290 million jin over the previous year, and output of peanuts also increased by 380,000 dan over the previous year for a 34 percent increase in output.

Why was it possible to harvest increased outputs from rice fields after they had been planted to peanuts? Analysis shows that every 100 jin of fresh peanut stalks and leaves contains 3.7 jin of nitrogen, 1.2 jin of phosphorous, and 3.5 jin of

potassium, the equivalent of 20 jin of ammonium sulfate, 6 jin of superphosphate, and 7 jin of potassium sulfate. Rice fields with peanut yields of 300 jin per mu produce from 1000 to 2000 jin of stems and leaves that can be returned to the fields, plus an additional 120 jin of peanut shells that can be used in other rice fields. In rice fields where peanuts have been grown, three-fourths of the nitrogen fixed by nodules on the roots of the peanut plants is absorbed by the peanuts themselves, but one-fourth remains in the soil. Approximately 2 to 7 jin per mu of pure nitrogen remains in the soil, the equivalent of the amount found in from 10 to 35 jin of ammonium sulfate. Furthermore, the change from wetness to dryness when paddy fields are used for the growing of peanuts also helps improve the soil. According to analysis of an experiment performed by the Yangjiang County Institute, after peanuts and rice have been rotationally cropped, the soil's organic content increased by 0.28 percent, total nitrogen increased by 0.01 percent, and total phosphorous increased by 0.021 percent.

When peanuts and rice are rotationally cropped, advantages may be exploited while avoiding disadvantages through regulation of the planting and harvesting seasons. The danger that the "cold dew wind" poses for late crop output in Guangdong Province is very considerable, so how can the threat from the "cold dew wind" be avoided? Agricultural authorities in Zhanjiang Prefecture found a new solution in the continuous cropping of "peanuts-rice-tubers." This prefecture is the foremost peanut producing area in Guangdong Province. It has more than 400,000 mu of wet fields for the annual triple cropping of spring peanuts, midseason rice, and late autumn tubers. It is only because midseason rice seeds are not yet up to standard that midseason rice output is lower than from the late crop and there can be no courageous promotion of it. Last year they planted more than 300,000 mu of the early ripening, high yielding, superior hybrid rice, "Shanyou No 6" as a midseason and late crop. The growing season for this hybrid rice is only 116 days, yet yields reach between 700 and 800 jin per mu for harvests of between 200 and 300 or even 400 jin more than from conventional varieties. This year the prefecture is preparing to promote this experience.

Continuous cropping of peanuts and rice also helps promote development of livestock raising. Peanut skins and peanut leaves and stems make good feed for the feeding of poultry and livestock. The protein content of peanut skins is as high as 30 to 50 percent, which makes it a superior quality feed such as the livestock raising industry cannot readily obtain. After continuous cropping of peanuts and rice was done by the Tangkeng Production Brigade of Changping Commune in Dongguan County, in addition to the return of peanut plants to more than 800 mu of fields, one-third of the plants were used as hog feed. The plants were mixed together with a small amount of peanut skins. As a result, the number of hogs raised rose from an annual 900 head in 1975 to 1960 head last year. The number of hogs sent to market also rose from the former 170 head to 900 head.

In summary, to use the words of the masses: "Use of low yield fields for continuous cropping of peanuts and rice increases fertility and improves the soil, and combines use of the soil with nurture of the soil to transform low output to high output of grain, oil, meat, and money, while at the same time being the road to riches."

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CSO: 4007

NANHAI COUNTY PER CAPITA DISTRIBUTIONS FOR 1980 GIVEN

Guangzhou NANFANG RIBAO in Chinese 24 Jan 81 p 1

[Article by Correspondent Liu Chaoye [0491 6382 2814] and Reporter Zou Canhua [6760 3503 5478]: "Per Capita Distributions Averaged 325 Yuan in Nanhai County Last Year; Last Night Comrades in Charge of Party and Government Organizations in the County Congratulated Advanced Units on Their Wealth"]

[Text] Tonight at the Xiaotang and Nanzhuang communes in Nanhai County there is a deafening sound of gongs and drums, and red flags are fluttering in a scene bustling with noise and excitement. Comrades in charge at the Nanhai County CCP Committee, the Standing Committee of the County People's Congress, and the County People's Government have come to these communes to offer them enthusiastic congratulations for all around growth last year in agriculture, industry, and sideline occupations, and for their joyous achievement of average per capita distributions of more than 400 yuan.

Early last year, the Nanhai County CCP Committee offered its congratulations to five production brigades in which per capita distributions had averaged more than 400 yuan. It announced at the same time that during 1980 any commune or brigade that had average per capita distributions of more than 400 yuan, any production team that had average per capita distributions of 800 yuan, or any commune operated enterprise that had profits of more than 1 million yuan would receive the congratulations of the county. Beginning tonight and continuing for several nights, comrades in charge in the county and in its departments and commissions will visit each advanced unit to offer congratulations and to encourage them to guard against conceit and impetuosity, and to work ceaselessly and unremittingly to continue to advance in the new year. This action signals to the people the County CCP Committee's firm resolve to carry out the programs and policies of the Third Plenary Session of the 11th Party Central Committee.

During the past year, both the cadres and masses throughout the county have made new strides along the common road to riches. Last year, the county's grain output exceeded the levels of the previous year, which were the highest ever recorded, with an increase in yields by 165 jin per mu, for a 86.4 million increase in total output. Last year, the county sold the state 288.8 million jin of grain, an increase in sales over the previous year of 14 million jin. In addition, it sold more than 100 million jin at negotiated prices. P'ond fish, sugarcane, silkworm

cocoons, and peanuts also showed increases in varying degrees. [illegible] last year from brigade and commune operated enterprises amounted to 149.76 million yuan, a 92.3 million yuan increase over the previous year. Profits from commune operated enterprises increased 55.49 percent over the year before last, and three commune operated plants showed profits of more than 1 million yuan. Accompanying the all around growth in agriculture, industry, and sideline occupations has been a continuous strengthening of the collective economy, an increase in accumulations, and remarkable increases in the level of distributions to commune members. In category 1 production teams in the county, average per capita distribution rose from the 240 yuan of the year before last to 325 yuan. In two communes in the county, per capita distribution averaged more than 400 yuan. Brigades in which per capita distribution averaged more than 400 yuan increased from the five of the year before last to 57. Production teams in which per capita distributions averaged more than 600 yuan rose from the five of the year before last to 57, of which 10 had distributions of more than 800 yuan.

In order to further enrich rural villages through out the county, while commending the collective coming into wealth of advanced models, the Nanhai County CCP Committee, the Standing Committee of the County People's Congre-s, and the County People's Government repeatedly expounded on the "five constants": constant program for the emancipation of thoughts, seeking truth in facts, liberalization of policies, and enlivening the economy; constant program for the paramouncy of grain, all around development of agriculture, forestry, livestock raising, sideline occupations and fisheries, and comprehensive agricultural, industrial and commercial operations; constant program of guidance for active development of commune and brigade enterprises to enable rural villages to become rich in the shortest possible time; constant program for exploitation of strengths and avoidance of weaknesses, making the most of advantages, and promotion of cooperation; constant policy of carrying out special policies and flexible measures for the active development of external economic activities, and going in big for bringing in materials for processing to bolster trade.

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CSO: 4007

BRIEFS

ILLEGAL LAND SALES--The Guangzhou Municipality Revolutionary Committee recently issued a circular on illegal land sales. Some organs, mines and factories, financial and economic enterprises have arbitrarily established contact and carried out illegal land sales with rural communes and brigades; this has been very serious. Evil consequences are expected if such malpractices are not curbed. Thus, the Guangzhou Municipal Revolutionary Committee issued a circular on renting and selling of land. The circular forbids individuals and units from privately occupying, transferring, changing, renting, selling in disguise or seizing land. Anyone who violates discipline will be fined and must vacate the premises within a set time. [HK231024 Guangzhou Guangdong Provincial Service in Mandarin 2345 GMT 11 Feb 81]

GUANGDONG FOREST FIRES--There were 296 forest fires in Guangdong in January, affecting a total area of 461,000 mu. The number of fires and the affected area were respectively 390 percent and 430 percent more than in January 1980. The provincial People's Government has twice issued circulars on improving forestry protection work this year. The circulars called on all areas to step up fire prevention precautions in view of the current drought and the imminent spring farming season. Cases of arson must be severely dealt with. [HK231024 Guangzhou Guangdong Provincial Service in Mandarin 2345 GMT 14 Feb 81]

FARM OUTPUT--Guangzhou, 8 Mar (XINHUA)--Guangdong's Foshan Prefecture increased its grain output by 570 million jin last year, about half of Guangdong's grain increase. Rural per capita income rose to 190 yuan, 45 yuan more than that of 1979. [Beijing XINHUA Domestic Service in Chinese 0222 GMT 8 Mar 81 OW]

CSO: 4007

BRIEFS

FOREST FIRE PREVENTION--According to a GUANGXI RIBAO report, the Guangxi Regional People's Government issued an urgent circular on preventing forest fires on 12 February , and held a telephone conference on the evening of 14 February on protecting forest resources and preventing forest fires. The telephone conference was presided over by Shi Qingsheng, deputy director of the Guangxi Regional People's Government, and Xiao Han, regional CCP Committee secretary and deputy director of the regional People's Government, delivered a speech. The circular and telephone conference of the regional People's Government demanded: 1) all prefectures, municipalities and counties appoint a responsible comrade to be in charge of the protection of forests and the prevention of hill fires; 2) regulation of the uses of fire in the forest areas be strengthened; 3) the setting up of patrols on tree farms and forest areas; 4) the rapid formation of fire brigades; and 5) investigation of all fires, and those guilty of arson duly punished. [HK2 31024 Nanning Guangxi Regional Service in Mandarin 1130 GMT 15 Feb 81]

CSO: 4007

MORE PHOSPHATE FERTILIZER PRODUCTION FROM FEWER PLANTS

Shijiazhuang HEBEI RIBAO in Chinese 12 Jan 81 p 2

[Article by Guo Bingjun [6753 8392 6511], Wang Jialin [3769 0502 2651], and Chang Weishan [1603 4850 3790]: "Handan Prefecture Realizes Increased Output and Increased Earnings by Reducing Number of Small Phosphate Fertilizer Plants. Resolved to Readjust Industrial Plants That Give Poor Economic Results"]

[Text] The phosphate fertilizer industry in Handan Prefecture has firmly resolved to carry out readjustment policies, closing or converting enterprises for which raw materials cannot be assured, that have high consumption, produce shoddy goods, and incur numerous losses in favor of concentrating forces to support development of key enterprises. Last year, phosphate fertilizer production in the prefecture amounted to more than 1.3 billion tons, more than 10,000 tons over the output for the highest year prior to readjustment. Effective phosphate content rose from approximately 10 percent prior to readjustment to more than 13 percent. Profits amounted to 300,000 yuan, marking the first time that the whole system has converted losses into profits.

In 1970, Handan Prefecture began constructing a group of small phosphate fertilizer plants, which have played a definite role in providing fertilizer to agriculture. But as a result of blindness in guiding ideas, some problems arose. One problem was that the supply of raw materials was not assured. The local area did not have the raw materials, so most of the phosphorous and sulfur ores needed to manufacture phosphate fertilizer had to be sought from Hubei, Hunan, Sichuan, and Guizhou provinces and they arrived only sporadically, making normal production impossible. Second, the simple and crude equipment produced a product of inferior quality. In many plants, technology was antiquated, equipment lacked coherence, and the quality of the products was low or inconsistent. Third, the layout was irrational, making for poor economic results. As a result of emphasis on "every county to operate plants and communes with proper conditions to operate plants too" in which overall planning was lacking, raw materials for some plants had to be hauled over great distances at high cost. When poor administration and management was added to this, most plants lost money year after year. By the end of 1979, phosphate fertilizer plants at the county level and above had accumulated debts amounting to 17 million yuan.

In their thoroughgoing implementation of the "eight character" policy for readjustment of the national economy, Handan Prefecture authorities in charge of

industry began with economic results. Following full investigation and study, they resolved to readjust the small phosphate fertilizer plants throughout the prefecture. In addition to closing completely 20 small phosphate plants operated by communes, they cut the size of 9 plants above the county level. They made satisfactory arrangements for the employees of the plants that were shut down. In the seven plants that were retained, forces were concentrated to support the four key plants at Wuan, Handan City, Ci County, and Yongnian that were close to rail lines and where technology was better than in most. The prefecture allocated more than 1.6 million yuan as expenditure for technical measures to improve these plants, thereby bringing total production capacity to more than 150,000 tons thus exceeding the pre-readjustment levels of production of 16 plants at the county level and above.

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CSO: 4007

HUMIC ACID FERTILIZER EXPERIMENTS DISCUSSED

Shijiazhuang HEBEI RIBAO in Chinese 15 Jan 81 p 2

[Article by Liu Qi [0491 6386]: "Good Results Obtained From Effectiveness Experiments With Nitrate Base Humic Ammonia, [Nitroputrescine], and Humic Nitrogen, Phosphorous and Potassium Fertilizers in Zhangjiakou Prefecture"]

[Text] Joint experiments performed between 1978 and 1980 by the Zhangjiakou Prefecture Agriculture Bureau on the effectiveness of nitroputrescine and humic nitrogen, potassium, phosphate, and humic sodium as compared with equivalent nitrogenous, phosphate, potassium and equivalent ammonium nitrate fertilizers were successful. Experiments included soaking of seeds in clear water and spraying of fertilizer on leaves. The experiments demonstrated that when 9 liang of humic nitrogen, phosphate, and phosphorous fertilizer at a strength of one part in 500 was used per mu of land for soaking corn and naked oat seeds and for spraying their leaves, yields of corn averaged increased of 39.53 jin for a 4.53-percent increase over the clear water control that was used. For naked oats, the average increase in yield was 7.2 jin per mu, or a 3.4-percent increase. As compared with equivalent nitrogenous, phosphate, and potassium mixed inorganic fertilizer, corn yields increased on an average of 51.17 jin per mu, a 6.55-percent increase, and yields of naked oats averaged increases of 14.6 jin or 6.46 percent. Putrescine fertilizer was used at the rate of 9 liang per mu in a 1 to 500 concentration, and when used for soaking seeds and spraying on plant leaves, it produced average increased corn yields of 223.47 jin per mu, or 25.63 percent as compared with the clear water control. For naked oats, it produced average increases in yields of 32.7 jin per mu, or 15.43 percent.

The experiments also showed that when these kinds of fertilizer were used to soak seeds and to spray on leaves, quantities were small and costs were low. Average cost per jin of corn for humic nitrogen, phosphate, and potassium fertilizers was 1.7 li [.0017 yuan] and for naked oats the cost per jin was 6.17 li [.00617 yuan]. Costs per jin of corn for nitroputrescine was 1.6 li [.0016 yuan], for one jin of naked oats, the cost was 7.17 li [.00717 yuan]. Average fertilizer cost per jin of grain was less than .01 yuan.

Use of these two kinds of fertilizer for soaking seeds and spraying on leaves can promote early sprouting of the seeds, early ripening, development of the root systems, sturdy and vigorous stems and leaves, and full use can be made of the

effective nutrients in the fertilizer, reducing the fixing of the nutrients in the soil. Experiments over the past 3 years have shown that crops will produce seedlings 1 or 2 days early, and ripening will occur 3 to 6 days early. At the same time, photosynthesis will be promoted and the light energy utilization rate increased. When humic nitrogen, phosphate and potassium fertilizers are used, the leaf area index for corn increased by 1.01 percent as compared with the control, and the functional leaf area increased by 2.46 percent over the control.

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CSO: 4006

BRIEFS

COCOON, MULBERRY OUTPUT--Hebei Province's cocoon production showed quite good results during 1980 when output for the spring, summer, and autumn crops totaled 1,482,000 jin, and tussah silk cocoons totaled 373,000 jin. Total output showed a 12-percent increase over the previous year. The seven base counties of Qinglong, Xinglong, Kuancheng, Qianan, Luan, Ding, and Xingtai produced a total of 1,645,000 jin of tussah and other silk cocoons, accounting for 80 percent of total silkworm cocoon output for the provinces. More than 9,000 mu were devoted to growing mulberry tree saplings, a 2.4-fold increase over the previous year. The seven base counties grew more than 3,700 mu of these seedlings. A total of 6.53 million large leaved prime mulberry trees were grown, a 4.3-fold increase over the previous year. Of this number, 4.72 million were grown in the seven base counties [Text] [Shijiazhuang HEBEI RIBAO in Chinese 13 Jan 81 p 1] 9432

COMMUNE SAVINGS RATE--As of the end of 1980, savings by commune members in rural villages of Hebei Province amounted to 860.04 million yuan, a 306.52-million-yuan increase over 1979. The annual increase was equivalent to commune members' savings deposited from the founding of the People's Republic up to 1976. Savings averaged 19.05 yuan for every member of the farming population in the province, to create the highest level in history. The main reasons for the great increase in savings by rural commune members were: 1. Income increased as a result of further implementation of the party's rural village economic policies that have aroused the broad masses of commune members' enthusiasm for doing a good job of collective production, and rapid development of sideline industries by commune members' families. 2. Beginning on 1 April 1980, the state made another upward adjustment in the interest rate paid on saving and increased the frequency with which deposits could be made, so that the broad masses of commune members realized the advantages of savings. 3. Banks and credit cooperatives (or stations) used all sorts of ways to give vigorous promotion to policies on savings, acted enthusiastically to serve depositors, and made deposits and withdrawals easy. For members in rural villages, they instituted awards of a basic allowance for savings in excess of a certain amount, further arousing the enthusiasm for the absorption of savings. [Text] [Shijiazhuang HEBEI RIBAO in Chinese 16 Jan 81 p 1] 9432

CSO: 4007

BRIEFS

COUNTY GRAIN OUTPUT--Harbin, 13 Mar (XINHUA)--In 1980, Bayan County in Heilongjiang produced some 910 million jin of grain and beans, 2 percent more than its 1979 output. The county in 1980 delivered and sold to the state 487 million jin of commercial grain, 27 million jin more than its 1979 delivery. [Beijing XINHUA Domestic Service in Chinese 0238 GMT 13 Mar 81 OW]

FORESTRY FUNDS--To balance tree planting and felling in 1981, the State Council recently approved a measure whereby forestry enterprises in Heilongjiang Province can draw 5 yuan for every cubic meter of timber handed over to the state to provide funds for fostering saplings and young trees. Heilongjiang Province will have 94.5 million yuan for developing forestry as a result, an increase of 40 million yuan over that of 1980. This fund mainly will be used for cultivating saplings, preventing and curing insect pests and plant diseases, preventing forest fires and increasing the number of machines needed for building forests. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 12 Mar 81 SK]

AFFORESTATION--The Heilongjiang Provincial People's Government urges all localities to insure that every household is distributed about 3 mu of fuel forests before the spring afforestation period. On 16 March the provincial forestry development bureau sent work teams to help localities designate lands for commune members to plant trees and build fuel forests. The province's land designation work has progressed very slowly this year. Only 2 million mu of lands have so far been designated to commune members to be used as fuel forests, accounting for only 20 percent of the projected figure. [SK170409 Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 16 Mar 81]

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BRIEFS

HENAN AGRICULTURE--Henan is promoting an upsurge of spring farming centered on improving wheat production. Last year the province reaped a good harvest despite various difficulties. Total value of agricultural output increased by 5 percent over 1979. Total grain output was 41.3 billion jin, almost up to the level of the great bumper harvest in 1979. Ginned cotton output was 800 million jin, double the 1979 figure. Total output of oil was 940 million jin, a 30 percent increase. This included 100 million jin of peanuts, an increase of 80 percent over 1979. Tobacco output was 400 million jin, a 13 percent rise. [HK231042 Zhengzhou Henan Provincial Service in Mandarin 20 Feb 81]

WATER CONSERVANCY MEETING--The Henan Provincial Water Conservancy Department recently held a conference to sum up last year's work and arrange the tasks for this year. Last year the province did well in readjustment of water conservancy construction work and reduced the number of projects from 94 in 1979 to 44. Projects were made more rational and realistic. This year the provincial CCP Committee has demanded that Henan produce 44 billion jin of grain, 6.3 million dan of cotton, and 10 million dan of oil-bearing crops, with corresponding developments in other sectors. It is therefore necessary to expand the irrigated area by 600,000 mu and carry out work to eliminate waterlogging on 1 million mu. The province should build another 500,000 mu of farmland with assured good harvests irrespective of flood or drought, control soil erosion over 360 square kilometers, solve the drinking water problem for 80,000 people, generate 260 million kwh of power by hydroelectric power, raise 62 million jin of fish, and carry out spring irrigation on 35 million mu of wheat and 10 million mu of major autumn crops. The number of water conservancy capital construction projects is to be cut to 33 this year. The focus of water conservancy work must be on strengthening management of the existing problems and developing their potential. Technical and management standards should be improved. [HK161415 Zhengzhou Henan Provincial Service in Mandarin 1100 GMT 15 Mar 81]

CSO: 4007

PREPARATIONS FOR OVERWINTERING CROPS IN HUANGGANG PREFECTURE UNDERWAY

Wuhan HUBEI RIBAO in Chinese 7 Jan 81 p 2

[Article: "Huanggang Prefecture Takes a Firm Grip on Field Care of Overwintering Crops, Winter-sown Crops on Large Areas Growing Well Throughout the Prefecture"]

[Text] Huanggang Prefecture is currently in the midst of taking a firm grip on the accumulation and movement of farm family manure in preparation for putting down winter fertilizer for the wheat and the rape to provide a good foundation for reaping a greater bumper harvest this summer.

All echelons of the party organization and government departments in this prefecture have given extreme emphasis to production during the winter season. They have made a key measure out of doing a good job of field care during the winter season and of reaping a bumper harvest this summer as a means of making up for losses caused by calamities and launching self-help in production. Once winter sowing was over, every locale diligently implemented a system of responsibility for field care of the overwintering crops. Fifty-four percent of production teams in the perfecture instituted systems of responsibility for field care of the summer grain and summer oil crops, with the responsibility being placed on work teams and on individual workers and with calculation of remuneration being linked to production; 38.4 percent of the production teams instituted contracting of work for segments of the production process with remuneration being calculated on the basis of fixed quotas. Implementation of systems of responsibility for field care aroused he enthusiasm of commune members. Throughout the prefecutre, a workforce of 1.. million was concentrated to begin field care in which application of fertilizer was the most important part.

As a result of last year's disaster, which reduced agricultural output and income, some communes and brigades did not have enough funds to buy chemical fertilizer. In order to solve this problem, they did a thorough job of inventorying warehouses and searching storage sites to locate effective sources of fertilizer supply. At the same time, they held discussions with the agricultural bank, and with supply and marketing, and production capital units, arranging for loans, credit, and borrowing to solve the problem of inadequate funds and fertilizer. They have applied fertilizer and cared for the crops on time, and growth is quite good.

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BRIEFS

COUNTRY CASTOR OIL--Xinzhou County has planted over 10 million castor-oil plants, overfulfilling this year's target. In 1980 the county harvested 700,000 jin of castor oil, from which the county obtained an additional 170,000 jin of edible oil and 320,000 yuan of income for its people. [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 10 Mar 81 OW]

COUNTRY SCIENTIFIC FARMING--Wuhan, 16 Mar (XINHUA)--As a result of popularizing scientific farming, Guangji County in Hubei reaped more than 500 million jin of grain and 23 million jin of rapeseed in 1980. [Beijing XINHUA Domestic Service in Chinese 0142 GMT 16 Mar 81 OW]

PUMPING STATION REPAIR--There are 1,750 electric drainage pumping stations with a total power of 620,000 kilowatts in Hubei Province. On the Yangtze River and the Han River, there are 56 larger ones, each with power above 800 kilowatts. Many pumps broke down from excessive use during the 1980 flood season. Recent efforts to repair the damaged pumps have restored serviceability to the majority of them. [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 13 Mar 81 OW]

AGRICULTURAL TECHNOLOGY--Thirty-six agrotechnical items in seven fields will be demonstrated and popularized in Hubei Province this year. The seven fields are new crop varieties, high yield cultivation techniques, cropping systems, soil and fertilizers, plant protection, special local products, fruit trees and animal husbandry. [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 16 Mar 81 OW]

AFFORESTATION--Since the beginning of spring, efforts have been made to plant trees in various parts of Hubei Province. By early March 2.23 million mu of land had been afforested. In the meantime, 150 million trees had been planed around houses and villages and along the roads and waterways. [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 12 Mar 81 OW]

CSO: 4007

BRIEFS

PREFECTURE STOCKBREEDING--There are now more than 3,900 cattle-raising households in Xiangxi Tujia-Miao Autonomous Prefecture, Hunan, and they are raising a total of 4,125 oxen. Longshan County now has more than 230,000 hogs in stock, topping the same period last year by 50,000 head. [Changsha Hunan Provincial Service in Mandarin 1100 GMT 13 Mar 81 OW]

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BRIEFS

COUNTY AFFORESTATION--Since last winter, Binhai County, Jiangsu has afforested 2,000 mu of land, planted trees around 70,000 mu of farmland and planted more than 5.14 million young saplings. [Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 13 Mar 81 OW]

PADDY RICE--Yunlyin Prefecture of Jiangsu Province plans to transplant 5.6 million mu of paddy rice in 1981, an increase of 400,000 mu over 1980. The prefectual party committee also urged all rural communes to give priority to the production of maize, sweet potato, soybean and other dry-land crops. [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 14 Mar 81 OW]

NEW RICE STRAIN--Nanjing, 12 Mar (XINHUA)--Jiangsu Province has bred a new strain of glutinous rice--"Shuang-cheng glutinous rice"--by means of radiological induction of mutation. An experiment in 1980 showed that the new strain could yield an average of 1,112 jin of glutinous rice per mu. Its growth period lasts between 160 days and 165 days. [Beijing XINHUA Domestic Service in Chinese 0015 GMT 12 Mar 81 OW]

AQUATIC PRODUCTS CONFERENCE--Jiangsu Province held a work conference on aquatic products 7-12 March in Nanjing. Some 300 persons attended the conference. They included responsible persons of aquatic products departments and aquatic products supply and marketing companies of various prefectures, municipalities and counties; responsible persons of various provincial departments concerned; and representatives of advanced units. The conference called for readjusting the internal structure of fishery, improving management, instituting the system of responsibility in fishery and paying attention to scientific research to promote production. [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 13 Mar 81 OW]

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BRIEFS

AFFORESTATION ACHIEVEMENTS--Jilin Province successfully overfulfilled the 1980 state assignment on afforestation. The province planted trees on over 2.36 million mu and cultivated saplings on 270,000 mu. More than 100 million trees were planted on the outskirts of villages and alongside roads, lakes, ponds and houses throughout the province. [Changchun Jilin Provincial Service in Mandarin 1100 GMT 12 Mar 81 SK]

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BRIEFS

DROUGHT CONFERENCE--On 9 March, the Shaanxi Provincial People's Government held an urgent conference to study the measures for resisting drought to protect wheat and spring sowing. Jiang Yi, provincial vice governor, presided over the conference. Bai Wenhua, Standing Committee member of the Shaanxi Provincial CCP Committee, also took part in the conference. The participants revealed that the drought has been worsening in the central and northern parts of the province since the spring festival. Some 8.6 million mu of farmland were affected throughout the province. Some of the wheat in the affected areas has withered. According to forecasts of the meteorological stations, there will not be heavy rain from March to mid-April. It was pointed out at the conference that irrigation must be stepped up in areas already under irrigation, while electricity departments must insure power supply and increase the spray-irrigated areas as much as possible. [Xian Shaanxi Provincial Service in Mandarin 2300 GMT 9 Mar 81 HK]

CSO: 4007

BUMPER COTTON HARVEST IN LIAOCHENG PREFECTURE

Jinan DAZHONG RIBAO in Chinese 25 Nov 80 p 1

[Article by Gong Benxin [1362 2609 2946] and Li Zunli [2621 6690 4539]: "Total Output of Cotton in Liaocheng Prefecture Triples Over Last Year, Distributions in 817 Production Brigades Throughout the Prefecture Average More than 300 Yuan, and 160,000 Households Have Incomes of More than 1,000 Yuan"]

[Text] Liaocheng Prefecture has reaped another bumper cotton harvest this year. Total output was 3 million dan, triple last year's output. As of 20 November, the state had procured 2.77 million dan of ginned cotton in the prefecture. Each cotton farmer supplied an average of 79 jin of commodity cotton, a 1.1 fold increase over last year. Total earnings for the prefecture were 670 million yuan, a 2.7 fold increase over last year, and amounting to 67 percent of total agricultural income in the prefecture. Average earnings for each cotton farmer increased from the 50 yuan of last year to 180 yuan.

As a result of the large scale increase in cotton output, the income of cotton farmers increased several fold. Every cotton farmer in the prefecture averaged rewards of 72 yuan, and rewards exceeded 1,000 yuan for 700,752 households. When collective distributions were added to this, in the 817 production brigades throughout the prefecture, distributions averaged more than 300 yuan, and 160,000 households, or 15.7 percent of the total number, had incomes of more than 1,000 yuan. The Laozhaozhuang Commune in Linqing County planted 27,000 mu of cotton for a total output of more than 4.8 million jin and earnings of more than 12.5 million yuan, or an average 360 yuan per person. When distribution of awards and distribution for workpoints was added to this, more than 51 percent of peasant households had incomes of more than 1,000 yuan.

The cotton growing villages in Liaocheng are jubilant now, and the broad masses of cotton farmers praise the Third Plenary Session of the 11th Party Central committee with one voice for having opened the door to wealth, they have removed the 20 year stigma of "dependence for three things because of poverty."

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GRAIN, EDIBLE OIL PRICES REDUCED IN JINAN

Jinan DAZHONG RIBAO in Chinese 22 Dec 80 p 1

[Article by Peng Zhiguo [1756 3112 0948] and Li Mingren [2621 2494 0088]: "Market Price Drops On Eight Different Negotiated Price Grain and Oil Commodities in Jinan City. Grasp Restructuring of Negotiated Prices As a Major Means of Controlling the Prices of Goods"]

[Text] Recently sales of eight different negotiated price grain and oil commodities including soybeans, black soybeans, peanut oil, sesame oil and sesame seeds in 186 grain shops (posts or stations) of the Jinan municipal grain system dropped in price at retail by 9.6 percent.

Acting in the spirit of a circular from the State Council, the Jinan Municipal Grain Bureau integrated the city's realities and drew up measures for controlling the prices of goods and for restructuring negotiated prices, made a new appraisal of the prices for negotiated price grain and oil sold by its grain shops, and followed the principle of protection of capital plus a small profit in deciding to lower the market price of some negotiated price grains and oils. Both black soybeans and tea beans [5420 6258 beans steeped to make a hot beverage] fell in price from 0.48 yuan to 0.44 yuan per jin. Soybeans fell from 0.52 yuan to 0.48 yuan per jin. Peanut oil and bean oil fell from 1.90 yuan to 1.85 yuan per jin. Sesame oil fell from 2.80 yuan to 2.70 yuan per jin. Sesame seeds fell from 1.25 yuan to 1.20 yuan per jin, and peanuts fell from 0.72 yuan to 0.70 yuan.

In order to do a truly good job of the restructuring of negotiated price grain and oil, in addition to launching a big investigation from top to bottom of the prices of grains and oils, the Jinan municipal grain system also aroused the masses to check and watch. They required each of their grain shops to mark prices clearly and to publicly post the parity prices, negotiated prices and retail prices for more than 20 grain and oil commodities, and to set up a comments book. Numerous grain shops also either revived or set up and perfected mass supervision and control meetings, taking into it representatives from businesses and institutions involved in grain supply, cadres from government organizations and streets, and representatives of the masses to act as price inspectors, and to diligently inspect and check on grain shop prices and quality of pairty and negotiated grains and oil, to put a firm halt to incidents of misrepresentation of inferior merchandise as being of good quality, and short weights and measures.

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BRIEFS

COLD STORAGE--The construction of Shanghai's largest cold storage for foodstuffs, the (Wuxing) Cold Storage of the No 2 Commercial Bureau, formally began on 12 March. The project includes two icehouses and auxiliary facilities such as a railway, wharf and workers' housing. It will have a refrigerating capacity of 26,000 dun upon completion. [Shanghai City Service in Mandarin 2300 GMT 13 Mar 81 OW]

CSO: 4007

MAJOR PROBLEMS IN SHANXI AGRICULTURE, THEIR SOLUTIONS DISCUSSED

Taiyuan SHANXI RIBAO in Chinese 7 Jan 81 p 3

[Article by Zhang Weibang [1728 4850 6721]: "Discussion of Major Contradictions in Shanxi's Agriculture and Thrust of Main Attack on Them"]

[Text] Problems in Shanxi's agriculture are numerous. In addition to problems with economic policies and administration and management, other problems exist such as drought, soil infertility, soil erosion, severe damage from windblown sand, frost and freezes, hailstones and such natural disasters, lack of forests, lack of grass, lack of pasturage, lack of firewood, lack of money, lack of machinery, and lack of electricity. With such a large number of problems, just what is the main contradiction? Most people feel that the lack of water is the main contradiction, so the main thrust of attack has been toward the building of water conservancy.

More than 80 percent of past state investment in agriculture in Shanxi has gone to water conservancy in a reflection of this idea. Is this idea valid or not? From an examination of Shanxi's natural geology and its effects on agriculture historically and at the present time, it is not difficult to see that this view has merit. Below are given various problems that merit thought, and in addition, from the answers to these problems exploration is made of just what the principal contradictions are in the agriculture of Shanxi Province and what the principal thrust in attacking them should be.

1. In Shanxi today, "9 out of 10 years are dry." Why has it not been dry historically?

Droughts are now a fairly common occurrence in Shanxi, and one might say that "9 out of 10 years are dry ones." But it has not always been this way. In ancient times, Shanxi was by no means dry. The drought conditions followed in the wake of the destruction of forests to bring the forestland under cultivation, and gradually intensified. According to the local annuals of the south central part of the province, during the 1,532-year period between the 24th year of the reign of the Chengtang emperor in the Shang Dynasty and the first year of the reign of the Jingdi emperor in the Han Dynasty (1688 B.C.-156 B.C.), there were only 6 drought years, meaning an average occurrence of once every 255 years. In the 773 years from the second year of the reign of the Jingdi emperor in the Han Dynasty to the first year of the reign of the Gaozu emperor in the Tang Dynasty (155 B.C.-618 A.D.), there were 8 years of drought, for an average occurrence of once every 97 years. In the 646 years from the first year of the reign of the Gaozu emperor in the Tang Dynasty until the first year of the reign of the Shizong emperor in the Yuan Dynasty (618 A.D.-1264 A.D.), there were 19 drought years, or an average of one every 34 years. In

the 104 years from the first year of the reign of the Shizong emperor in the Yuan Dynasty to the first year of the reign of the Hongwu emperor in the Ming Dynasty (1264 A.D.-1368 A. D.), there were 14 drought years, or an average of one every 7.4 years. In the 276 years between the first year of the reign of the Hongwu emperor in the Ming Dynasty to the first year of the reign of the Shunzhi emperor in the Qing Dynasty (1368 A.D.-1644 A. D.), there were 61 drought years, or an average of one every 4.5 years. In the 268 years between the first year of the reign of the Shunzhi emperor of the Qing Dynasty until the first year of the Republic of China (1644 A.D.-1911 A.D.), there were 108 drought years, or an average of one every 2.5 years. Between the first and 37th year of the Republic of China (1912-1949), there were 17 drought years or an average of one very 2.2 years. In the period since Liberation from 1949-1979, there have been 24 drought years or an average of one every 1.2 years.

It may be seen that up until the time of the Han Dynasty, virtually no drought problem existed in Shanxi, and up until the time of the Yuan Dynasty, drought was not severe. Only after the Yuan Dynasty did drought conditions show a marked increase in seriousness. Since data is lacking about changes in climate, it is impossible to estimate with accuracy the effects of climatic variations on the gradual intensification of drought, but analysis of numerous reliable data shows that destruction of forests to bring land under cultivation, and destruction of the ecological balance are the main reasons leading to the year by year increase in the seriousness of drought conditions.

In ancient times, Shanxi did not look at all as it does today, with its barren hills and bald mountains and a scene of desolation on every side; its forests were dense, its mountains green, and its waters clear. The "Shuijingzhu" written by Li Daoyuan [6786 6670 0955] during the Northern Wei Dynasty [424 A.D.-532 A.D.] recorded the vista of 1,500 years ago in the Shanxi highlands as follows: "The shade from a variety of trees intermingles and the many clouds touch the mists, "verdant cypress trees on the misty summits and clear springs rushing from the heights;" "row upon row of pines adorn the crags and ranks of cypress stretch as far as the eye can see." Following the Three Kingdoms [222 A.D.-277 A.D.], as a result of increases in the population, expansion in clearing of land for agriculture (particularly following institution of a system whereby land was given to military colonists), frequent warfare, and large-scale development of agriculture and forestry by the rulers of successive dynasties, the forests of Shanxi suffered grievious destruction and the natural environment gradually deteriorated. The "Outline of the Annals of Jin" written by Kang Jitian [1660 1015 3944], which describes several historical events provdes evidence:

1. During the reign of the Dazhong Xiangfu emperor in the Song Dynasty (1008-1015), only cypress from Lan, Shi, and Fenyang was selected for the building of the Qingzhaoying palaces, for which a corvee of 30,000 or 40,000 was used daily. The quality of Shanxi cypress is dense and heavy, which made for difficulties in transporting it.

2. In the second year of the reign of the Zhihe emperor in the Song Dynasty (A.D. 1055), Magistrate Han Qi [7281 3823] reclaimed 9,600 qing of land for agriculture in order to stabilize the area east of the river.

3. In the Hecha (Heicha) Mountains, 80 li to the southeast of the Xing country seat, the verdant green stretches to the skies. Here are tens upon tens of thousands of pine and Chinese juniper trees, dense and flourishing. (To this day there are remnant forests of pine and oak.)

4. In the Xingding reign year during the Jin Dynasty [A.D. 1217-1222], the ruler at Jinan issued an imperial decree for the clearing of the wilderness, commanding that all berry bushes and jujube trees within 100 li be cut down.

5. In the reign of the Hongwu emperor in the Ming Dynasty (1368-1398), timber from the Luya Mountains was from trees of various kinds. The trunks reached to the clouds and blotted out the sun. The forest that blocked the way to the northwest was a majestic as the Yangtze River and the Great Wall.

6. In the fifth year of the reign of Yongle in the Ming Dynasty (1407), timber was brought from Shanxi and Sichuan to build palaces in Beijing.

These data demonstrate that up until the Ming Dynasty, the Luya Mountain area of Shanxi still had luxuriant primeval forests. Up until just before the War of Resistance Against Japan, at Jinshan in Jiexiu County and at Renzushan in Ji County, there were still some cypress and pine forests. Historically Shanxi has been a major timber producing area. In the building of the palaces in the ancient capitals at Beijing, Changan, Kaifeng, and Loyang, Shanxi was the supplier of most of the lumber. It can be seen that as a result of long-term denudation of forests and indiscriminate clearing of land for agriculture, and as a result of the destruction caused by warfare, the forests were destroyed, and this was the major reason for the deterioration of Shanxi's climate and the intensification of drought conditions.

2. If "9 out of 10 years are drought years" in Shanxi, why are the forest areas not dry?

The drought situation in Shanxi is quite serious, but not everywhere is dry. All the forest areas are not dry, and the farmland adjacent to forest areas is not dry. For example, in Wuzhai County, the place with the least drought is the Yangquangou Commune at Nanshan (located at the foot of a forest area). The Qianshan District in Taigu County is extremely arid, but the farmland below Jinpo (a slope that the masses have sealed off where the forest trees are luxuriant) is not very arid. In the Xishan area of Shanxi, aridity is severe, but Guandishan in the Xishan area and the Guancenshan forest region are not only not arid, but they are the places with the most precipitation in the province. Rainfall amounts to between 700 and 800 millimeters or even as much as 1,000 millimeters per year. The masses say, "When the weather is dry, the rains drench the mountain; with forests the springs never run dry," which is a moving testimony to how forests increase rainfall and conserve water resources.

3. In Shanxi the streams now lack water. Why is it that historically the Fen River was large enough to be navigated?

Ground runoff is lacking in Shanxi now, and there is little water in the rivers. The largest river, the Fen River, only flows in a trickle and is of no use at all for shipping. Mountain ravines are numerous, but almost all of them are dry. Has this been the situation historically? Not at all. Historically the volume of water in Shanxi's rivers was very great. The navigability of the Fen River carrying grain to the capital attests to this. Please read the historical record below:

1. During the reign of the emperor Wudi in the Han Dynasty in A. D. 113, the "Qiufengci" ["Autumn Breeze Poems"] by Liu Che said, "Floating storeyed ships crossed the Fen River; as they crossed the current, they formed white ripples." It may be seen that at that time large ships could navigate the Fen River, and the river had clear ripples.

2. During the fourth year of the reign year called Wufeng during the reign of Xuandi of the Han Dynasty (54 B.C.), a bumper harvest was reaped as a result of which the price of grain dropped and the farmers suffered. A dan of grain sold for only 5 qian. The grain was transported through the Fen (River) into the Huang (He), and then into the Wei (He), and then on to Hedong (present day southern Shanxi), Shangdang (present day southeastern Shanxi), and Taiyuan prefectures for supplying the capital city. (See the "Book of Han," Chronicle of Xuandi).

3. The Wuhuan tribes invaded China, and in preparation to beat them back, Cao Cao dug a canal from Lutuo to the Fen, which was called the canal to suppress the barbarians, and which was used to get to the Fen and make shipments to Taiyuan to protect the northwest ("Brief Account of Jin's Preparations for War").

4. In the third year of the Xinghe emperor in the Eastern Wei Dynasty (A.D. 541), a granary was built at Yangchangban in Lanzhou, which was the old city of Fenyang, from which grain was shipped along the Fen River to Taiyuan ("Brief Account of Jin's Preparations for War")

5. During the third year following the founding of the Sui Dynasty (A.D. 583) chestnuts were shipped from Fenjin to Changan. Ships went along the Wei into the Huan, and from the Huang into the Fen. ("Brief Account of Jin's Preparations for War").

6. According to the "Chronicle of Chinese Industry", the only navigable river in Xinfeng County was the Fen. When the waters rose, they might reach a depth of 1 zhang 5 chi, or they might recede to only 3 chi, but ordinarily they were 5 chi deep. ...the waters flowed smoothly; there were no hidden rocks, and sailboats navigated the waters during the summer and early fall.

It may be seen from the above that the Fen River formerly contained a quite large volume of water, and the ability of sailing ships to traverse it is an irrefutable fact. But why then did the volume of water in the Fen River decline later on? Mostly for no other reason than the destruction of the forests.

Just how great is the function of forests in retaining water resources? According to a Japanese survey and analysis, Japan has 375 million mu of forests (a 68 percent ground cover rate), capable of storing 220 billion cubic meters of water (equivalent to the storage capacity of all the existing large reservoirs in China). Each 10,000 mu of forests can store an average of 6 million cubic meters of water. These figures may be slightly high and may pertain only to dense forest areas that get a lot of rain. I do not believe that afforestation in Shanxi would result in the retention of such a large volume of water. It is generally estimated that for China, every 10,000 mu of forests can store 200,000 more cubic meters of water than unforested areas. Possibly this figure is somewhat on the low side. But even if calculations are made on the basis of this figure, the role of forests in water retention is extremely impressive. Were Shanxi to afforest 100 million mu, the quantity of water retained could be increased by 2 billion cubic meters. This amounts to almost the effective storage capacity of four Fen River reservoirs.

Once afforestation has been done, water resources conditions can be improved, and a representative example of such exists in Shanxi. In Youyu County there are 612 streams of more than 1 kilometer in length that were formerly virtually dry. But as a result of large area afforestation, which raised the afforestation rate from the former 0.3 percent to 25.1 percent, a striking improvement occurred in the condition of water resources. Now clear water flows in 251 streams, so in order to improve the condition of water resources in Shanxi, the most fundamental measure to be taken is afforestation.

Erosion in Shanxi is serious. Why is there no erosion in forest areas?

Some people say that Shanxi is in the loess highlands where erosion can scarcely be avoided. Granted that erosion is related to the properties of loess (wind blown, loose, easily corroded, and developed through longitudinal jointing), but the most fundamental reason for erosion is the denuding of forests, the irresponsible clearing of land, and the over pasturing of cattle that has destroyed the ground cover. Where there is forest or grass cover, even in the loess region erosion is slight. The modulus of erosion in forested areas is about 200 to 500 tons per square kilometer per year, but in denuded loess areas, the modulus of erosion reaches about 10,000 tons or even as much as 20,000 tons (along the Jiushui He in Lin County). This represents a 50 to 100 fold difference between the two. Consequently, only after afforestation and the planting of grass can the erosion problem be solved.

5. In Shanxi there is a great amount of windblown sand. Why is it that a great decline has taken place during the past several years in the amount of windblown sand in Youyu County where the windblown sand was most severe formerly?

Formerly Youyu County was the worst place in the province for windblown sand. It was recorded in "Youyu County Geography" written toward the end of the Qing Dynasty that "suddenly the wind begins to blow and the shifting sands throughout the area are swirled around by the wind. Farming becomes impossible, and livestock raising becomes impossible. It is a harsh land." The city wall of Youyu City, which was built during the reign of the Wanli emperor [1573-1620] in the Ming Dynasty (and which was 3 zhang and 6 chi high (on the northwest side), was completely buried by windblown sand long before the War of Resistance Against Japan. At that time, there was 200,000 mu of shifting sand in the county, and when the air was regularly filled with windblown sand, the masses would say, "The wind blows only once each year, but then from spring until winter." At the time of spring sowing, strong winds frequently blew away the surface soil and the seeds with it. Planting begun in the forenoon had to be abandoned in the afternoon, and had to be done two or three times each year. Now a great change has come over the appearance of Youyu. More than one-quarter of the land has already been afforested, and surface windspeed has reduced by from 21 to 55 percent. Daily frequence of sandstorms has decreased by 50 percent, and windblown sand has been brought under effective control. Now seedlings grow from a single sowing, and the harsh land of the past that was Youyu is now extolled as "an oasis on the Great Wall." The living example of Youyu shows that afforestation is the most fundamental measure in halting windblown sand.

6. Shanxi has lots of hailstones. Why are there no hailstones in forest areas?

Shanxi has a lot of hailstones, but hailstones do not occur everywhere. Hailstones frequently occur in regions where forests are scant. There are no hailstones in forest areas. For example, in the Jinshantan region of Yanbei Prefecture hailstones occurred frequently in the past. During the 1950's forests were created, and ever since 1961 (when the trees formed forests), there have been no more hailstones, while in unforested communes and brigades beyond the forest area, hailstones still frequently fall. This shows that afforestation can prevent hailstones.

7. Shanxi has a lot of frosts and freezes. Why is it that in fields that are checkerboarded with a forest network, frosts and freezes are greatly reduced?

In autumn 1978, frosts and freezing caused severe damage in Wuzhai County, while at the Qiansuo Production Brigade in that county where farmland has been laid out in a checkerboard design with a newtwork of forests, there was virtually no freeze damage and losses were small. This shows that forests can increase temperatures, and increase humidity to improve the microclimate of fields and reduce or avoid natural disasters. A comparison of the last 10 years in Youyu County with the period 1957-1961 shows a lengthening of the frostfree period by 15 days (from 112.8 days to 128 days), a fact which also attests this point.

Additionally, we can see that the soil in forest areas and close to forest areas is also more fertile. Organic content in some places is more than 5 percent. Firewood for the masses is sufficient in forest areas. Quite a few advanced wealthy brigades got their start by planting forests or by developing forests. Examples are the Xigou Brigade in Pingshun County, the Linyi Brigade in Changzhi County, the Gukou Brigade in Qi County, the Gaiyanggu Brigade in Xiyang County, and the Qugu Brigade in Hequ County.

In view of the problems illustrated above, it is not difficult to form a conclusion as to just what the key element is in the problems that are restraining agriculture in Shanxi, or what the main contradictions are. Very clearly destruction of the forests and grasslands, and the serious imbalance of the natural ecology are the main contradictions for agriculture in Shanxi. Afforestation and the planting of grass is an urgent task for the Shanxi highlands, and the main direction for attack in the development of agriculture in Shanxi Province. It should form the main focus for investment in Shanxi's agriculture, and should be provided with the fullest funding and manpower. If only the forests and the grasslands increase, Shanxi's agriculture will come alive and a whole series of problems will become amenable to solution.

Afforestation and restoration of the natural ecological balance has now aroused more and more serious attention. Nevertheless, quite a few people still lack a full appreciation of this, and have not absorbed the past lessons of experiences. They still rely on old experiences for farming, and their brains still contain the traditional onesided notions--water, water, water. They want to get water by hook or by crook and without the price they have to pay for it. The Xiyang County "eastward movement of western water" project is an evil consequence of just such thinking. Right now there are some comrades in charge of agriculture who can see only 58 million mu of cultivated land, but who cannot see the 100 million mu of barren mountain resources in Shanxi. Rather than figure out how to make the entire province green through afforestation and the growing of grass for a fundamental solution to Shanxi's problems, they go after water without reckoning the cost, as in the case of the proposed project for "diverting the Huang He into Shanxi." It is said that realization of this "grand" new plan will require an investment of almost 1 billion yuan (more than the total state investment for water conservancy in Shanxi during the 30 years since liberation), and a labor force of several hundred thousand. I do not believe that the project for "diverting the Huang He into Shanxi" is necessary. Not only will it waste money and manpower, but it will be of no benefit to agriculture. If the determination and the funds for the planned "diversion of the Huang He into Shanxi" (or only a portion of the determination and the funds) could be used for the afforestation of the Shanxi highlands, the benefits for Shanxi's water resources would far exceed those obtainable by "diversion of the Huang He into Shanxi."

On the problem of afforestation, many comrades also believe that its role is great, yet they feel that "distant waters are of no help in slaking a nearby thirst." Benefits from afforestation will come slowly, but benefits will not have to await a distant

future. For example, did not the Linyi, Gukou, and Baiyanggu brigades in Xia and Xigou counties see results within a short period of time (5 to 10 years) following afforestation? Benefits have been particularly instantaneous from the growing of trees on the four sides [house side, village side, roadside and waterside], and from the development of economic forests and firewood forests. Though results are slower in coming from the afforestation of barren hills, still they are not a matter of the distant future. In Anze, Ji, and Youyu counties, where large area planting o of trees was done during the 1970's, forest now stand, some of which have grown into useful timbe

The total ea of Shanxi Province is 237.9 million mu, of which statistics show the cultivated a to be more than 58 million mu (the actual cultivated area may be somewhat m than 70 million mu), forestlands to be about 24 million mu, and an estimated 20 million mu of grasslands suitable for grazing (principally grasslands in high mountains). Rivers and reservoirs, cities, towns, and villages, and roads, figuring 30 million mu for each category use 132 million mu. This means that another 105.9 million mu of land is barren hills and wasteland. Some of the cultivated land in Shanxi has been senselessly cleared for agriculture. Hanging on the slopes of hills where the slope is very steep (from 15 degrees to 25 degrees and more), erosion is severe. This land should not be farmed any longer but returned to forests or to grazing. Thus, in future the area of cultivated land should be appropriately decreased. Thirty million mu of the 105.9 million mu of barren hills and wasteland (including cultivated land not included in the statistics) can be used for the growing of grass or for the oepning of manmade cattle ranges. The remaining 75.9 million mu could be used for afforestation. Is the afforestation of more than 70 million mu possible over the next 10 or 20 years? Entirely possible. Within Shanxi Province, numerous actual examples give vigorous reply. For example, Ji County with a population of only somewhat more than 70,000 has annually afforested more than 60,000 mu since 1978, with a survival rate of better than 70 percent, for an average afforestation of 0.85 mu per man year. There are 24 million people in the entire province, 20 million of them being the farming population. At the rate of afforestation by Ji County, each year 17 million mu could be afforested, and only 4 years would be required to complete the task of planting forests on barren hills. Even at a rate only one-third that of Ji County, 5.7 million mu could be afforested annually, and within only 13 years the task of afforesting somewhat more than 70 million mu could be completed.

The Taigu County tree farm has only 70 employees, but during the past 2 or 3 years, they have annually afforested 2,000 mu, with a survival rate of more than 75 percent for an average afforestation of almost 30 mu per man year. It should be explained that sometime ago people had dug pits for holding trees or water on the sides of barren hills at the Taigu tree farm, thereby obviating some ground preparation work. But even taking this element into account and figuring only half the work done, that still amounts to 15 mu per person per year. At an afforestation efficiency rate of the employees of the Taigu tree farm, if 7.5 million mu could be afforested annually, only 500,000 people would be required to do the job, and this figure amounts to no more than 5.3 percent the figure for the total labor force in the province (which was 9.372 million in 1978). Moreover, afforestation by the masses of more than 2 million mu annually has not been figured in.

On the basis of these two actual examples, it would be entirely possible to complete the afforestation of the entire province within 10 years time, and completion of this task within 20 years would be even less of a problem. With gradual mechanization of afforestation, very great savings in labor could be realized. Thus, the afforestation

of Shanxi highlands is not a question of being possible or impossible; it is a question of having or not having the determination to get on with it. Recently Comrade Zhao Ziyang [6392 4793 7122] pointed out that were the energy and funds used for water conservancy to be used for forestry, forestry would easily increase. These words are entirely correct.

Afforestation and the planting of grass to make the Shanxi highlands green is a great battle to transform nature. In order to fight this battle well, it is necessary to strengthen the organization of leadership, use unified planning, designate combat zones for state forestry farms and for counties, dividing up the work and assigning a portion to each in order to complete the task. Afforestation and the planting of grass must be done in accordance with the conditions and characteristics of different areas with an adaptation of general methods to local circumstances. It must take as its point of departure the building of a forestry and livestock industry in which results can be seen quickly and benefits great. It is envisaged that by the end of this century, more than 75 million mu will have been afforested, and 30 million mu of grassland planted. This, plus the existing area of forests and grasslands, will total 150 million mu. Thus the forest and grass covering rate may reach 63 percent. If this can be done, a fundamental transformation will take place in the natural appearance and in the appearance of agriculture in Shanxi Province, and a glorious modernized agriculture possessed of a fine ecology and a rational economic structure will be just around the corner.

(Appreciation is expressed to Comrades He Lintian [0419 2651 1331] and Sun Yuangong [1327 0337 7255], who compiled some historical data.)

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BRIEFS

CASTOR BEAN PROCUREMENT--Castor bean output in Shanxi Province last year was the best on record, and progress in state procurement was likewise the fastest in recent years. Statistics as of 5 December showed the 13.15 million jin of castor beans had been purchased by the state throughout the province and put into warehouses. This represents a 4 percent overfulfillment of quotas issued by the provincial government for all areas. The quantity purchased is almost sevenfold that of the same period in the previous year. Linfen Prefecture and Luliang Prefecture, the major producing areas, exceeded purchase plan quotas by almost double and by 30 percent respectively. Though procurement of castor beans is now finished throughout the province, an imbalance exists in the rate of warehousing with more than 10 counties that have not yet moved the beans into warehouses. These counties should act promptly for active procurement and promptly procure the oil crops that should be procured. [Text] [Taiyuan SHANXI RIBAO in Chinese 8 Jan 81 p 1] 9432

TAIYUAN RICE HARVEST--Last year the southern suburbs of Taiyuan triumphed over drought to reap a bumper harvest of rice over a wide area. Output totaled more than 52.37 million jin, a more than 20 percent increase over the previous year. Average yields per mu also rose from the previous year's 838 jin to 910 jin. On 4,000 mu of hybrid rice, yields averaged 1,200 jin per mu, and the highest yield was 1,478 jin per mu to create a maximum record for a single crop of rice. Why was the extent of increase for rice so great last year? The main reasons were an adaptation of general methods to local situations, and making the most of local advantageous water conservancy conditions and the expertise of the masses in growing rice. It also resulted from the adoption for use of new techniques in growing seedlings, rational close planting, and promotion of chemical herbicides and scientific application of fertilizer. [Text] [Taiyuan SHANXI RIBAO in Chinese 8 Jan 81 p 2] 9432

AFFORESTATION RALLY--The Shanxi Provincial Government and the Taiyuan Municipal Revolutionary Committee held an afforestation mobilization rally on 11 March. Responsible comrades of the provincial CCP Committee, People's Congress Standing Committee, government and CPPCC, PLA units stationed in Shanxi, Taiyuan Municipal CCP and revolutionary committees including Luo Guibo, Wang Tingdong, Wang Kewen, Zhu Weihua, Wang Xiujin, Li Budo, Zhao Lizhi, Shi Jiyan, Hu Xiaoqin, Tao Pu, Chen Xigong, Wang Manlin, Zheng Tianyi, Yan Wahong, Yue Weifan, Jia Chongzhi, Ai Pengqi, Pan Ruizhong, Wang Dingmen, Yang Mingbao, (Yan Dingchu), (Zhang Pong) Xu Zhenhai, (Tong Yun), (Bai Yu), (Shen Zhong), (Li Wengxian), (Jia Maoting) and (Xie Zibo) attended the rally with over 4,000 representatives of the masses. Provincial CCP Committee second secretary and Governor Luo Guibo made a speech. He dwelt on the significance of afforestation and the importance of forestry? The area of forest in Shanxi has grown from 3.32 million mu at the time of liberation to 23 million mu. However, the province ranks 21st in the country in forest cover. It is necessary to work hard to improve this situation. All sectors should contribute to this effort. [HK160700 Taiyuan Shanxi Provincial Service in Mandarin 2300 GMT 11 Mar 81]

BUMPER RICE HARVEST IN CHENGDU SUBURBS REAPED

Chengdu CHENGDU RIBAO in Chinese 3 Jan 81 p 1

[Article: "Bumper Harvests of Hybrid and Guichao No 2 Rice in Suburbs; Adaptation of General Methods to Specific Situations and Scientific Farming"]

[Text] The suburbs have reaped bumper harvests from large area plantings of hybrid and Guichao No 2 rice. Statistics show average yields of 840 jin per mu from 490,000 mu of hybrid rice for the city, and average yields of 800 jin per mu from 300,000 mu of Chichao, for increased yields of from 50 to 100 jin per mu greater than from conventional rice varieties.

Last year all prefectures and counties in the suburbs gave great attention to agricultural production, and strengthen leadership for rice production. After diligent summarization of experiences with increased output during the year before last, they made clear proposals about hybrid rice and Guichao No 2, making them a major means for increasing total output and requiring that each commune and production brigade adopt general methods to their local situations for their promotion. Meanwhile, the Municipal Agriculture and Forestry Bureau and agricultural units in all counties and districts each separately organized technical cadres to conduct technical training of groups in communes, after which the communes gave training to cadres above the work team level by way of laying a foundation for the promotion of superior varieties of rice. In planting and field care, each commune and brigade gave attention to sparse sowing of seed grain for the propagation of numerous tillers and strong seedlings, suitable improvement in closeness of planting, increased the numbers of basic sprouts and scientific application of fertilizer, shallow watering, prevention and control of disease and insect infestations, and such key measures. This provided reliable assurance for consistent increases in output from hybrid rice and from Guichao No 2.

At the present time, every prefecture and county is engaged in the summarization of experienced in increased rice output, determined that this year a greater bumper harvest of hybrid and Guichao No 2 will be won from the 1.1 million mu in the city's suburbs.

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SWEET POTATO PRODUCTION IN SICHUAN DEVELOPING

New Sweet Potato Varieties

Chengdu SICHUAN RIBAO in Chinese 25 Dec 80 p 2

[Text] Recently the deputy director of the Provincial Academy of Agriculture, Zhou Yuzhen [0719 3768 2182], led a group of agricultural scientists to Zizhong County for an on-site appraisal of Chuanshu 27, a new variety of sweet potato, in the course of which everyone put forward numerous beneficial suggestions about production of sweet potatoes in Sichuan Province. These have been summarized in the following three points.

1. An overwhelming majority of the sweet potato varieties currently in large area production in Sichuan Province were introduced from abroad during the 1940's and 1950. Not only is there now a welter of varieties, but they long ago degenerated. The Shengli No 100, which is now widely grown, was introduced from Japan in 1947, and the Nanruitiao was introduced from the United States in 1940. At the time of their introduction, these two varieties had yields of between 4,000 and 4,500 jin per mu. Today, they look the same and taste the same, but with the passage of time, selection of seed stock and purification and rejuvenation have not kept apace, so their outputs have vastly declined generally to about 1,500 to 2,000 jin per mu, and they can no longer be used as the dominant sweet potato variety. It is hoped that the authorities concerned will conscientiously implement propagation and promotional work for superior varieties of sweet potatoes.

2. Efforts to tap the output potential for sweet potatoes. Several years ago, Sichuan Province took in hand the extension of cultivation of superior corn and rice varieties, and output rose. In Sichuan Province, corn, rice, and sweet potatoes each occupy about one-third of the total cultivated area. If for the next several years, while continued efforts are being made to continue to tap the potential of rice and corn output, efforts are also made to extend the cultivation of superior sweet potato varieties, sweet potato output throughout the province will be bound to make a substantial breakthrough. During the past several years, we have bred some quite good bumper output varieties that may be promoted. But even if we were to do a good job in the selection of seed stock and in purification and rejuvenation of the original varieties, output would be much higher than currently. Therefore, it is suggested that every echelon of leadership make a start by taking in hand good methods and good varieties of

sweet potatoes, selecting superior seed stock in an effort to tap the output potential of sweet potatoes. Right now is the time to make full preparations in many ways for next years adaptation of general methods to specific situations in promoting superior sweet potato varieties.

3. Rapid translation into productivity of research achievements in sweet potato output. In scientifically and technically advanced countries, as soon as an accomplishment in research appears, specialized organizations immediately undertake its promotion in a set of well-organized actions. China's research and promotion is frequently disjointed, and when an achievement appears, it may not be promoted for many years. It is recommended that authorities concerned establish with all possible speed a rather complete system for promotion and use, so that research achievements in sweet potato production will be translated into productivity as soon as possible.

'Chuanshu 27'

Chengdu SICHUAN RIBAO in Chinese 25 Dec 80 p 2

[Text] Recently the deputy director of the Provincial Academy of Agriculture, Zhou Yuzhen [0719 3768 2182], led a group of agricultural scientists and comrades from pertinent provincial units to the Zizhong County sweet potato varieties experimental area to work in conjunction with local leaders, agricultural scientists and production team cadres in the on site digging, criticism by comparison, and appraisal of a new sweet potato variety, Chuanshu 27. It was unanimously agreed that this variety was a fine one with high output, numerous stalks, good taste, and broad adaptability.

The hybrid Chuanshu 27 was bred in 1973 by crossing "Nanruitiao," the female parent with "Meiguohong," the male parent. From 1974 until 1977, it was propagated from seedlings, and following appraisal and comparison with other varieties, it was subjected in 1978 to testing in various regions throughout the province and to fairly widespread production, which demonstrated its comparative superiority. Following on-site appraisal and acceptance by the provincial seed company in October 1979, there was both a continuing of testing and rapid propagation and promotion. During 1980, it was test planted on an area of 400,000 mu in 15 test sites throughout the province.

Development of a new variety usually requires three years of local testing before the variety may be promoted for widespread use. This is the last year of local testing for Chuanshu 27. Despite continuous autumn rains, which are unfavorable for sweet potato production, on site examination and digging of roots for inspection during July and October at 15 test sites in the province showed that output of sweet potatoes would still exceed that of Shengli 100, and yields averaging 4,000 jin per mu were predicted. At test sites in the No 2 and No 4 production team of Jiaotong Production Brigade in Fengan Commune, Zizhong County, in tests at two different terrace levels, tests with close planting, tests with plantings at different times, and tests in intercropping with corn and no intercropping, the results of on site harvests were average yields of 4563.2 jin per mu of Chuanshu 27, and an output of 1,726 jin of sweet potato stalks. The stems and leaves are fine, tender, and juicy, making a fine feed for hogs. On site harvest

results from 53 sites in seven counties including Jianyang, Ziyang, and Leshi in Neijiang Prefecture showed Chuanshu 27 to be superior to Shengli 100.

Recently 16 units including the Science Education Office run by the Provincial Department of Agriculture, the seed company of the Provincial Agriculture Department, the Science Office, the Science Office of the Provincial Agricultural Academy, the Crop Institute, the Neijiang Prefecture Seed Company, the Zizhong County Agricultural Bureau, the County Science Committee, the Agricultural Science Station of Fengan Commune, and the production teams that participated in the local tests conducted an on-site harvest and comparative criticism and appraisal of Chuanshu 27, acknowledging that Chuanshu 27 has quite good bumper output characteristics, its increased output is evident, has good taste, quite broad adaptability, profuse growth, high output of stalks and leaves, and is a hopeful sweet potato successor variety for Sichuan Province.

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PRC ECONOMIC JOURNAL ON FISHERY PRODUCTION

HK1008822 Beijing JINGJI GUANLI in Chinese No 1, 15 Jan 81 pp 37-38

[Article by Zhou Yishi [0719 5030 2514] of the Economics Research Office of the Sichuan Provincial Institute of Social Sciences: "An Investigation into Development of Fish Breeding in Pushun County--While Taking Sole Responsibility for Profits and Losses"]

[Text] Pushun County in Sichuan Province has favorable conditions for developing freshwater fish breeding. Pushun County is situated in the hilly region in the middle of Sichuan. It enjoys warm weather, and has vast water areas. It has more than 13,000 ponds and weirs, with the total area of more than 19,500 mu; 190 large and small reservoirs, with the total area of more than 20,000 mu; 380,000 mu of fields used to store water during winter; and 136 large and small rivers, with the total area of more than 11,000 mu. In the past, due to the influence of the ultraleftist ideological line, agriculture was carried out one-sidedly under the slogan of "Taking Grain as the Key Link." As a result, "all the rest was swept away." Fishery simply had no status in the agricultural economy of Pushun County. A total water area of several hundred thousand mu lay idle. Since 1979, the county has taken up "fish breeding with sole responsibility for profits and losses," and efforts have been concentrated on on "sole responsibility." Those who can engage in fish breeding may breed, and those who are willing to engage in fish breeding may also breed. Thus, the masses' enthusiasm for fish breeding has been brought into play. As a result, over 90 percent of the total area of reservoirs, ponds and weirs, and 22 percent of the fields used to store water during winter have been used for fish breeding. In 1979, the fish yield of the whole county was 3.4 million jin, averaging 3.3 jin per person, 3 times higher than the average yield for the rest of the province. It was really a reflection of the saying "The green water remains the same, but the fish yield was really increased because of the implementation of the system of fixing yield quotas and adopting sole responsibility for profits and losses." The three methods the county has been using are:

The first is to permit specialty groups or specialty households to take up the task of fish breeding in reservoirs, ponds and weirs. Remuneration is calculated on the basis of combined production. A reward and compensation system of work responsibility is thus carried out. An example of this can be seen in the third production team of Juanba which is a part of the Donghu commune in Pushun County.

In 1979, a specialty group of 12 persons took up the job of breeding in 20 mu of choiced fish ponds and 2 mu of fingerling ponds. The system of "fixing the water areas, the number of persons, the yield value, the production costs, the remuneration, the rewards for overfulfilling production quotas and the compensation for not meeting production quotas" was carried out. As result, the yield of fish for last years was 13,730 jin, with an average of 686.5 jin per mu and the total income was more than 10,000 yuan. Each member of the production team received an increase of 62 yuan in income.

The second method is to let specialty groups or the commune members take up the job of fish breeding in ricefields and in fields used to store water during winter. They may be responsible for the yield or for the yield value. They may also pay fixed amounts of money. Fish breeding in ricefields is carried out after the rice has been transplanted, depending on the willingness of the individuals concerned. Plots are provided according to proximity. Thus commune members are responsible for water management and for fish breeding in the fields which in fact is a way of combining water management with fish breeding. This method has not only mobilized the masses on a large scale to carry out fish breeding and fully utilize water resources, but has also increased the rice yield and increased the collective's and the commune members' income. In 1979, the sixth production team of Jixing which is part of the Xinxing commune in Fushun County, permitted 71 households (91 percent of the total number of households) of commune members to take up the job of water management and fish breeding on 128 mu of ricefields (52.5 percent of the total area of fields). The requirements were: 1) The fields were to be divided into 3 categories according to their water storage capacity and to their fertility; each mu of the first category fields rented for 1.5 yuan, each mu of the second category fields rented for 1 yuan, each mu of the third category fields rented for 0.5 yuan. Rental charges were paid to the production team. The disposal of adult fish was left to the discretion of the breeders themselves. 2) According to the principle of "taking rice as the primary factor, and combining rice production with that of fishery," they were required to do a good job in water management so as not to affect rice production. 3) The production team did not give workpoints for water management. The commune members themselves were required to solve the problems regarding fingerlings and fishing equipment. As a result, a good job was done in water management and fish breeding, and a double harvest of rice and fish was reaped. The total fresh fish yield was more than 5,500 jin for the entire year. The total income was 4,400 yuan, of which the income of the collective was 1,430 yuan (excluding those workpoints not given out for water management), and the income for the commune members was 2,970 yuan.

The third method was to let those operating boats either in partnerships or as individuals take up the job of fishing and netting in the rivers, as entrusted by the fishing cooperative. The fishing cooperative had 72 fishing boats. The fishing and netting yield was determined according to the conditions of the equipment on each of the fishing boats (the yield of each boat was fixed to be 900 jin on the average, the maximum was 1,440 jin, and the minimum was 500 jin). The value of yield was calculated according to the price of carp, and the quotas to be turned over to the fishing cooperative were fixed on the basis of 55 percent of the yield value. The maintenance cost for equipment was also fixed. The system of fixing quotas and sole responsibility for profits and losses was carried out. In case of overfulfillment of production, half of the quantity that had been overfulfilled

was to go to the fishermen, and the other half was to be turned over to the fishing cooperative. As a result of the implementation of the system in 1979, 63 fishing boats fulfilled or overfulfilled their tasks. The maintenance cost for equipment dropped by more than 1,800 yuan. Thirteen fishing boats and a large number of fishing nets and other fishing equipment were purchased with the money turned over to the fishing cooperative. Thus, the productive force was further promoted.

The policy of fish breeding with sole responsibility for profits and losses, has brought into play the enthusiasm of the broad masses for fish breeding. The problem of whether or not fish breeding is to be carried out has been solved. This is bound to be followed by the problem of how to do a good job in fish breeding. The problem of scientific fish breeding has been placed on the agenda. In order to popularize scientific fish breeding, the three technicians from the aquatic production section of the county bureau of animal husbandry have also one in for fish breeding with sole responsibility for their profits and losses. They have divided up the work among themselves. They give technical instructions to the peasants while helping them do a good job in fish breeding. They observe the system of rewards for overfulfillment of production and compensation for nonfulfillment of production. Each one of them is determined to have one high yield field, to give technical instructions to one production brigade and to get in touch with one commune. A "contract for technical popularization" must be signed between the aquatic production section and the production team. Insofar as how to place fingerlings in water, how to prevent fish diseases and how to carry out management are concerned, technical instructions must be given on the spot. Management measures must be adopted according to the month, and yield is to be determined according to the conditions of the pond. The technicians are required to carry out supervision and instruction work in the production teams regularly. In case of overfulfillment of production, the production teams gives 10 to 20 percent of the part that has been overfulfilled as a bonus to the cadres of the aquatic production section who take part in the work. If production drops due to inappropriate adoption of measures, the aquatic production section is responsible for the compensation of 10 to 20 percent of that part that has dropped. In so doing, the technicians of the aquatic production section may have the rights, the responsibilities and the benefits, and they can give full play to their specialities. With the support and help of the technicians, the masses have felt at ease, as if they had taken "a sedative."

Practically, these are the following benefits in fish breeding with sole responsibility for profits and losses:

First, the breeder's responsibility is closely linked to his own benefits, thus the masses' enthusiasm for fish breeding is brought into full play. They make every effort to do a good job in fish breeding. Nearly everyone in the sixth production team of Jixing is concerned with fish breeding in the fields used to store water, and these fields, receive constant attention from the breeders. On the evening of 15 August 1979, there was a heavy downpour, and torrents fell on the fields. Many commune members voluntarily stood guard beside the fields the entire night, paying attention to the conditions of water and controlling the volume of flow so that the fish in the fields were safe and sound.

Second, renumeration is calculated, and rewards and compensation are determined on the basis of the end results of fishery production. This causes the laborers

to care for the quality and efficiency of their labor in the whole process of fishery production, pay attention to economizing and constantly promote productivity.

Third, with the participation of fish breeders in productive labor, the knowledge of scientific fish breeding will be popularized, and a specialty contingent for fish breeding will be gradually formed. This will lay the foundation for the modernization of fishery. By combining the requirements for the development of fishery production with the concrete practice of the localities, the comrades of the aquatic production departments of Fushun County, have opened fish breeding technical courses in many forms for the 867 fish breeders and cadres at the grassroots level in 7 communes. They have got twice the results with half the efforts. Not only has knowledge of fish breeding been popularized, but the areas for breeding have also increased a great deal. The utility of water in these 7 communes is higher than the other communes by 20 to 56 percent. Reservoirs and ponds are fully utilized.

Fourth, there are many forms for doing this work, so that the water may be fully utilized. Each specialty group is responsible for a large area of water, each specialty household or each of the combined households is responsible for a smaller area, and each individual is responsible for even a smaller one, so that the water may be fully utilized. In this way, the material wealth of the society and the income of the commune members will increase.

In my opinion, fish breeding by fixing quotas with sole responsibility for profits and losses, and basing the calculation of renumeration on combined production, are in compliance with the characteristics of fishery production and with the principle of to each according to his work. Rights, responsibilities and benefits are thus unified, and the breeders have motivation. Why is it that over 1.8 million mu of reservoirs and ponds and over 14 million mu of water storage fields in the rest of Sichuan Province are not used for fish breeding? And why is it that the average single yield is so low in reservoir and pond fish breeding? One important reason is that some cadres still have a lingering fear, they have not gotten rid of the leftist line, nor have they taken up the job of fish breeding by taking sole responsibility, instead they are doubtful and hesitant. All work for the socialist cause must be done with individual responsibility. "Common responsibility" is in reality no responsibility, and it should not be allowed to continue. We hope that the communes and teams which have the conditions for fish breeding will learn from Fushun County. According to the concrete practice in their own localities, they should make an analysis on how to enhance their own productive forces, in order to make full use of the water areas and to make full use of those individuals who are specialists in fish breeding. Scientific management should be carried out. Let the specialty groups or the specialty households take up the work of fish breeding. Strictly exercise the system of rewards and compensation. In this way, we will surely change our backwardness in fishery production.

CSO: 4007

BRIEFS

ANIMAL HUSBANDRY CONFERENCE--The Sichuan conference of the directors of the animal husbandry bureaus throughout the province was recently held in Wenjiang. The participants seriously summed up the experiences of animal husbandry work and studied the issues concerning management of animal husbandry farms this year. There are some 200 million mu of grassland in the province. However, they pointed out that pig raising is the main topic in animal husbandry. They have studied the measures for stabilizing and developing the output of pigs, grass-eating animals and poultry. During the conference, responsible comrades of the provincial CCP Committee and the provincial People's Government listened to the conference reports and gave important instructions. Yang Wanxuan, secretary of the provincial CCP Committee, spoke at the conference. [Chengdu Sichuan Provincial Service in Mandarin 1100 GMT 9 Mar 81 HK]

CSO: 4007

BRIEFS

COUNTY WEED KILLER--Last year, Bainang County, Xizang used weed killer on 2,000 mu of winter wheat and Qingke fields with results. [Lhasa Xizang Regional Service in Mandarin 1130 GMT 13 Mar 81 OW]

SPRING FARMING--Lhasa, 10 Mar (XINHUA)--Spring farming is underway in Lhasa area. Nyingchi County has completed around 50 percent of its spring sowing. The county has also completed one round of watering of its more than 20,000 mu of winter wheat and highland barley which have become green again following winter dormancy. The county has also completed some top dressing and hoeing for some of the crops. Zuxu County has selected and adopted more than 700,000 jin of fine seeds for spring farming. Ground leveling, farm implements repair and other preparations for spring farming are also being done in Maizhojunggar and Lhunzhub counties. [Beijing XINHUA Domestic Service in Chinese 0808 GMT 10 Mar 81 OW]

SURPLUS GRAIN--Commune members in the rural areas of Xizang Autonomous Region have by now sold some 98 million jin of surplus grains to the state in support of the four modernizations, exceeding the 1979 procurement quota by 8 percent. Thanks to the policy formulated by the central authorities to remit Xizang's agricultural tax for a period of 2 years, the commune members' productive enthusiasm has been greatly aroused. Rural commune members of Gyangze County have sold some 600,000 jin of surplus grains to the state, or 10 percent of the total amount of grains purchased in this country. [Lhasa Xizang Regional Service in Mandarin 1130 GMT 15 Mar 81 OW]

CSO: 4007

BRIEFS

WATER CONSERVANCY PROJECTS--The Yunnan Water Conservancy Office has again sorted out 36 large- and medium-scale water conservance projects. The office has decided to stop and suspend construction of 21 projects in accordance with the central authorities' principle to further readjust the national economy and with the realities in our province. Fifteen projects have been retained. The original investment has been reduced from 40.7 million yuan to 19.67 million yuan. In mid-February, the provincial water conservancy office issued an urgent circular which demanded that the various units do a good job in the aftermath of the stopped and suspended projects. [Kunming Yunnan Provincial Service in Mandarin 1100 GMT 10 Mar 81 HK]

CSO: 4007

BRIEFS

ZHEJIANG TREES--Hangzhou, 16 Mar (XINHUA)--Gardeners and horticultural workers in East China's famous lakeside city of Hangzhou are busy planting shade trees and shrubs to beautify the scenic city as part of the national afforestation drive. More than 60,000 new saplings have been planted on hillsides, in parks and along West Lake dikes since late February. About 400,000 trees will be planted this spring, said a spokesman for a recently formed greening committee. According to the local bureau of parks and woods, there is now only 0.67 square meters of afforestated area in the city proper for each Hangzhou inhabitant, which is far below the stand standard. Hangzhou grew a total of 46.6 million trees over the past three decades and opened new parks and afforestated areas of 254 hectares. But vegetation covered only 10.05 percent of urban areas. This year, the city government has allocated more funds for afforestation. In other parts of Zhejiang Province, a half million people now take part in tree planting daily for a week or more as part of the campaign. A total of 34,000 hectares of hilly areas have been afforestated and 20 million trees have been planted along roads and other places. Tree sapling nurseries cover 340 hectares, according to provincial authorities. [Beijing XINHUA in English 0720 GMT 16 Mar 81 OW]

TREE PLANTING--On 12 March, Arbor Day, more than 1,000 leaders and cadres of Zhejiang Province went to the suburbs of Hangzhou to plant trees. Among them were Guan Junting, secretary of the provincial CCP Committee; Wang Fang, deputy secretary of the provincial CCP Committee; (Li Chaolong) and Zhai Xiwu, Standing Committee members of the provincial CCP Committee; Wang Qidong and Zhu Zuxiang, vice chairmen of the Standing Committee of the provincial People's Congress; He Zhibin, vice chairman of the provincial CPPCC Committee; (Zhang Zhucai), deputy commander of the provincial military district; and Xia Qi, Yang Jilin and (Zhang Youfu), deputy political commissars of the provincial military district. The same day leading comrades of the party and government organizations of Hangzhou Municipality, including Zhang Jangtang, Chen Anyu, Zhou Feng and Chen Xia, and commander of Hangzhou Garrison District (Wnag Shouren) also planted trees in the suburbs. [Hangzhou Zhejiang Provincial Service in Mandarin 1100 GMT 12 Mar 81 OW]

COUNTY CATTLE--As of the end of 1980, Ninghai County, Zhejiang had more than 3,000 oxen raised by peasant families. In that year, the county extended 260,000 yuan in loans to cattle-raising households. [Hangzhou Zhejiang Provincial Service in Mandarin 0400 GMT 8 Mar 81 OW]

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II. PUBLICATIONS

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Foreign Agricultural Science and Technology

Front Cover: Blooming Rape...Yang Juwei [7122 5281 3489]

Inside Front Cover: International Rice Research Discussion Meeting, Sponsored Jointly byChinese Academy of Agricultural Sciences and International Institute of Rice

Inside Back Cover: Introduced Varieties of Oil-producing Safflower...Li Dajue [7812 1129 3635]

Back Cover: Snail's Damage to Citrus...Chen Deniu [7115 1795 3662]
Gao Jiaxiang [7559 1367 4382]

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CSO: 4007

AUTHOR: ZHU Baozhen [2612 2128 4176]
LEI Xiaoen [7191 1321 1869]

ORG: Both of the Institute of Atmospheric Physics, Chinese Academy of Sciences

TITLE: "A Study on the Formation of Mean Flow Pattern in the Stratosphere"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 289-299

TEXT OF ENGLISH ABSTRACT: Using a P-coordinate given as an equation, we derived a three-layer model in which the motion of the troposphere and stratosphere is described. From the solution of the linearized equations, the dynamical control and the steady perturbations produced by topography and heating are discussed.

It is found that the topographic and thermal forced waves with zonal wave number 1-3 are able to penetrate into the stratosphere. The phase of the mountain waves is vertical, but the heating waves tilt westward with increasing height. Both orography and heat sources are important in explaining the mean flow pattern in the stratosphere, but the tropospheric and stratospheric heating play the dominant role in the formation of the Aleutian high at 30 mb. The large amplitude of the forced perturbation in the stratosphere is mainly due to the very small air density.

AUTHOR: WANG Xiaolin [1769 2556 2651]
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ORG: WANG Xiaolin and WU Hui of the Department of Geophysics, Beijing University; WANG Baoren of the Central Station of Marine Hydrometeorological Forecast, National Marine Service

TITLE: "A Test of Variational Initialization for a Baroclopic Primitive Equation Model"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 300-308

TEXT OF ENGLISH ABSTRACT: In this paper, we utilize the variational method to the initialization for a baroclopic primitive equation model. As a dynamic constraint, the differences between the observed and analyzed fields are [illegible] minimum subject to the quasi-geostrophic relations or the requirement of quasi-steadiness for the primitive equations, which is required to keep the loss of total kinetic energy over the analyzed area at a minimum. Twenty-four hour 500 mb height forecasts are made and compared with those obtained in taking the geostrophic wind as initial fields. In the case experiment, the observed data are partly used in the initial fields, the [illegible] are improved and the [illegible] are [illegible].

AUTHOR: LIAO Dongxian [1675 3139 0341]
WANG Liangping [1769 0357 4990]
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ORG: All of the Academy of Meteorological Science, Central Meteorological Service

TITLE: "A Direct Method Suitable for Calculating Divergence, Vorticity and Vertical Velocity in Use of Observational Data"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 409-120

TEXT OF ENGLISH ABSTRACT: In this paper, a direct method for calculating divergence, vorticity and vertical velocity on the computer, without objective analysis, is proposed. A similar technique is applicable to calculation of physical quantities, such as gradient, advection and flux.

However, in practical application, there still remain some problems to be solved, such as the incompatibility between the number of the vertical boundary conditions usually specified in an atmospheric model and the order of the equation of continuity, the problem of how to calculate the vertical velocity in the case of

[Continuation of QIXIANG XUEBAO No 4, Dec 80 pp 409-120]

uneven vertical resolution and the case of mountainous regions.

To tackle these problems, some preliminary methods have been suggested and the equivalence of two different formulations of vertical velocity has been discussed. The formulations are as follows:

1) If the vertical distribution of div $\vec{V}$ is given, solve the equation

$$\frac{\partial \omega}{\partial p} = -\operatorname{div} \vec{V}$$

under the condition: at $p = p_0$, $\omega = \omega_0$;

2) If the vertical distribution of $\frac{\partial}{\partial p}$ div $\vec{V}$ is given, solve the equation

$$\frac{\partial^2 \omega}{\partial p^2} = -\frac{\partial}{\partial p} \operatorname{div} \vec{V}$$

under the conditions: at $p = p_T$, $\omega = 0$ and at $p = p_s$, $\omega = \omega_s$, where p_T is the pressure at the top of the model atmosphere assumed, and p_s is that at the earth's surface. It can be shown that only when the condition

$$\omega_s = \int_{p_T}^{p_s} \operatorname{div} \vec{V} dp$$

is satisfied, the two formulations can be said to be equivalent.

[Continuation of QIXIANG XUEBAO No 4, Dec 80 pp 309-320]

Finally, calculations of some physical quantities for a case of large-scale heavy precipitation in south China are given. The results seem reasonable and in agreement with most forecasters' experiences.

AUTHOR: TAO Zuyu [7118 4371 4477]

ORG: Department of Geophysics, Beijing University

TITLE: "The Structure and Formation of the Meiyu Jet Stream"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 2, May 80 pp 151-160

TEXT OF ENGLISH ABSTRACT: By use of the fairly dense network of radio soundings and pilot balloons, the three-dimensional structure and the formation process of the [illegible]

AUTHOR: FENG Liwen [7458 7787 2429]

ORG: Institute of Geography, Chinese Academy of Sciences

TITLE: "The Rainy Season and Its Variation in Beijing during the Last 255 Years"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 341-350

TEXT OF ENGLISH ABSTRACT: In this paper, the rain and clear sky observations in Beijing by the Royal Observatory of the Qing Dynasty were used and combined with instrumental records to reconstruct the rainy seasons from 1724-1978. Their characteristics and variations were discussed and concluded as follows:
1. There were six patterns of the rainy season in Beijing during the past 255 years, and each of them prevailed for a certain period of time.
2. The beginning date of the rainy season in Beijing on the average was in the last third of June, ranging from the early part of May to the last third of August. Its ending date, on the average, was in the second third of August, ranging from the last part of June to the last third of September. The average length of the rainy season was 50 days, ranging from 10 to 115 days. The average number of days in the rainy season was 32, ranging from 9 to 82 days.
3. A 10-year moving average showed that the duration of the rainy season became longer toward the end of the 255-year period which may be divided into four periods as follows:

[Continuation of QIXIANG XUEBAO No 4, Dec 80 pp 341-350]

(1) The period of 1733-1781 was characterized by a late beginning and early end, thus making this period the shortest rainy season in the last 255 years.
(2) 1782-1824: both the beginning and ending dates were late, but the duration of the rainy season was not short.
(3) 1825-1938: the rainy season was composed of several fluctuations with various amplitudes, most of them being short.
(4) 1939 to the present: an early beginning and late ending made for a longer duration of the rainy season. In the last 10 years (1969-1978), the rainy season was the longest. The beginning date was earlier than normal by five days and the ending date was later than normal by 10 days, thus the length was longer than normal by 10 days.
4. The cycle analysis of the last 255 years of Beijing showed that the beginning date had a cycle of 4.5 years and the ending date had cycles of 4 and 85 years; the duration has cycles of 170 and 85 years.

AUTHOR: XIE An [6200 1344]
XIAO Wenjun [5135 2429 0193]
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ORG: All of the Department of Geophysics, Beijing University

TITLE: "Kinetic Energy Budget of Sub-synoptic Scale Disturbance during the Mei-yu [Plum Rains] Season"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 351-359

TEXT OF ENGLISH ABSTRACT: The kinetic energy budget of sub-synoptic scale disturbances which produces heavy rainfall during the Mei-yu [plum rains] season is computed by using conventional rawinsonde and height data. The main results of this study are as follows: 1) In the calculation of kinetic energy, the divergent part of the wind cannot be neglected; 2) Kinetic energy is exported from the disturbance toward the surrounding atmosphere; 3) The rate of kinetic energy generation by rotational wind is negative, while that of the divergent wind is positive in the upper and lower troposphere. The summation of the two parts is still negative, and the subgrid scale kinetic energy exchange exerts a significant effect on the kinetic energy budget of the disturbance. In other words, the moist convection developed in the conditional unstable atmosphere is

[Continuation of QIXIANG XUEBAO No 4, Dec 80 pp 351-359]

an important process in the moist baroclinic atmosphere. Hence, this probably is a proof of the importance of the role of water vapor in the motion of the atmosphere.

These results are helpful in understanding the mechanism of this disturbance and in improving the design of the numerical model.

AUTHOR: FENG Daxiong [6785 1129 7160]

ORG: Academy of Meteorological Science, Central Meteorological Service

TITLE: "A New Gelatin Film Technique for Measuring Cloud Droplets"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 4, Dec 80 pp 360-366

TEXT OF ENGLISH ABSTRACT: Gelatin film with adsorbed iodine vapor is used for measuring cloud droplets. It can be used for continuous sampling of cloud droplets. The traces of droplets are clear with high contrast. The sampling quality is better than that of other current methods. Experimental results concerning the relation between the diameters of water droplets and those of their traces on the film, the minimum sensible droplet diameter and the critical unbroken drop diameter during high speed sampling are given.

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